

Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

E. A. SIMMONS, President.
L. B. SHERMAN, Vice-President. HENRY LEE, Sec'y & Treas.
The address of the company is the address of the officers.

EDITORS

SAMUEL O. DUNN, Editor
ROY V. WRIGHT, Managing Editor

W. E. HOOPER	H. F. LANE	F. W. KRAEGER
B. B. ADAMS	R. E. THAYER	K. L. VAN AUKEN
E. T. HOWSON	A. C. LOUDON	E. G. ZACK
H. H. SIMMONS	C. B. PECK	GEORGE L. FOWLER
	C. W. FOSS	

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00
Canada	6.00
Foreign Countries (excepting daily editions).....	8.00
Single Copies.....	15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention daily issues, North America, \$1; foreign, \$2.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,800 copies were printed; that of these 8,800 copies 7,391 were mailed to regular paid subscribers to the weekly edition, 250 were provided for counter and news companies' sales, 1,102 were mailed to advertisers, exchanges and correspondents, and 57 were provided for samples and office use: that the total copies printed this year to date were 392,700, an average of 9,350 copies a week.

Statement of the ownership, management, etc., of the *Railway Age Gazette*, published weekly at New York, N. Y.:

Editor, SAMUEL O. DUNN, Transportation Bldg., Chicago, Ill.
Managing Editor, ROY V. WRIGHT, Woolworth Bldg., New York, N. Y.
Publisher, SIMMONS-BOARDMAN PUBLISHING CO., Woolworth Bldg., New York, N. Y.

STOCKHOLDERS:

EDWARD A. SIMMONS, New York.	ROY V. WRIGHT, New York.
LUCIUS B. SHERMAN, Chicago, Ill.	ELMER T. HOWSON, Chicago, Ill.
HENRY LEE, New York.	A. C. BOARDMAN, Riverdale, N. Y.
I. B. RINES, New York.	F. BOARDMAN, Riverdale, N. Y.
SAMUEL O. DUNN, Chicago, Ill.	B. BOARDMAN, New York.
RAY MORRIS, New York.	

BONDHOLDERS:

S. W. DUNNING, New York.	C. C. NEWCOMB, Brooklyn, N. Y.
ESTATE OF WM. H. BOARDMAN, N. Y.	H. D. HORTON, Brooklyn, N. Y.
CHARLES M. PRATT, New York.	

SIMMONS-BOARDMAN PUBLISHING COMPANY.
By E. A. SIMMONS, President.

Sworn to and subscribed before Harry E. French, Notary Public for Kings County, N. Y. (No. 15), whose certificate is filed with the County Clerk of New York (No. 13), and whose commission expires March 30, 1916, on September 17, 1914.

VOLUME 57

OCTOBER 16, 1914

NUMBER 16

Contents

EDITORIALS:

Editorial Notes	681
The Use of Torpedo Machines in England.....	682
What We Are Trying to Do.....	683
*Southern Railway	684

MISCELLANEOUS:

*Practical Hints on Operation of Terminal Yards.....	686
*Eight-Wheel Steel Caboose for the Pennsylvania.....	691
Effect of the War on Prices of American Railroad Bonds.....	694
*The New Algoma Central Engine House.....	698
Railway Affairs in Other Countries.....	700
Effect of the Panama Canal on Coast-to-Coast Traffic.....	701
*Tests of Vanadium Steel Rails.....	704
British and German Exports of Railway Material.....	706

GENERAL NEWS SECTION..... 708

*Illustrated.

Vanadium has become favorably known through its use as an alloy in rolled and cast steel and to a limited extent in cast iron.

Vanadium in Rail Steel

The principal application of this metal in the railway field has been in wheels, axles, locomotive frames and tires, main rods and piston rods, crank pins and springs, in all of which it has been in service long enough to demonstrate its ability to improve the quality of the steel either by reducing the breakage, increasing the wear, or both. This success has prompted an experiment in the application of this alloy to rail steel. On account of the service required of a rail and the differences inherent in the manufacturing process, particularly the impracticability of heat treating rails as commonly practiced for locomotive parts, the result of this experiment will be looked forward to with much interest. The laboratory tests reported elsewhere in this issue show favorable comparisons with untreated open hearth rails rolled at the same time, but the service of these rails in the track will be the ultimate measure of their value. The reduction in the cost of vanadium, which has amounted to more than sixty per cent, is the important feature at present, as this makes it commercially possible for this alloy to enter the rail field and insures further tests, which will increase the number of possibilities of solving the rail problem.

October 19 has been set as the day for a rehearing in the eastern rate case. Now comes the announcement by the Interstate

Is This Petty Politics?

Commerce Commission that the investigation into the Chicago, Rock Island & Pacific has been set for October 16, with J. W. Folk, of the New Haven investigation notoriety, as counsel. Just before the commissioners announced their refusal to grant an increase of freight rates in the last investigation, they made public a report on the New York, New Haven & Hartford affairs which, regardless of the accuracy of the facts, was presented in a yellow manner wholly unworthy of the Interstate Commerce Commission. For years every right-thinking railroad man and banker has deplored the Rock Island situation. The holding companies scheme, which vested control of the Chicago, Rock Island & Pacific Railway in the hands of Daniel G. Reid and Judge Moore, was and is indefensible. It has fallen to the ground through its own inherent defects. Is it possible that the Interstate Commerce Commission is going to permit the confusing, either in its own deliberations or, still worse, in the public mind, of the questionable practices of a few men a dozen years ago and the broad, vitally important economic question of the present straits of the transportation system of the United States? We venture to predict that every important fact which the Interstate Commerce Commission is going to "discover" about Rock Island affairs has been made public already, and the subject has been fully discussed in the *Railway Age Gazette*. Is it possible that the commissioners take such a small view of the tremendous responsibilities resting on them at present that they will let this particular stale scandal cloud the minds of even the least thinking people in connection with the reopening of the rate advance case?

One of the serious drawbacks to efficient yard operation is a lack of appreciation of the importance of high standards of track construction and maintenance and the necessity for good locomotives. New 100-lb. rail and rock ballast on yard tracks could not be justified, but on the other hand 65-lb. rail and no ballast are not economical on yard ladder tracks which frequently carry more cars than the main line, and the same locomotives, although at reduced speeds. The importance of better track construction in yards is being realized on a number of roads

Yard Maintenance and Standards

which are laying heavier rail and using better ballast. At the same time the condition of the tracks in the average yard is far below what it should be. As a result there is too much repairing of tracks after derailments have occurred and not enough upbuilding to prevent derailments. A derailment not only results in the destruction of track and equipment, but, more important, it interferes with and ties up the operation of that portion of the yard until the damage is repaired. Fully as important is the question of proper switching locomotives. When road locomotives which require overhauling are assigned to switching service for a time to secure a greater mileage before making repairs or locomotives too light to haul tonnage trains on the main line are sent into the yard, the yard operation suffers. Worn drivers increase the number of derailments and are destructive of track, while defective locomotives in general are inefficient in operation in a yard the same as on a main line. Likewise, engines too light to handle a full cut of cars delay operation through the entire yard. It is coming to be the more general practice to equip yards with engines designed especially for switching service, which is in line with economical operation. The old feeling that as long as the track and motive power will stand up they will do for the yard is fast disappearing. As about forty per cent of the total time of the average loaded freight car is spent in yards, an entirely disproportionate part of a railway company's total operating expense is in its terminals, and as the freight yards are always the first points of congestion, at least the same effort should be made to provide facilities necessary for the economical operation and proper handling of railroad traffic in the yards as on the main line.

Rectangular engine house designs are not new, but the one adopted by the Algoma Central at Sault Ste. Marie, Ont., and

**Circular
or Rectangular
Engine Houses**

described elsewhere in this issue, is unique and furnishes a good illustration of proper adaptation of uncommon designs to local conditions. In most cases where such houses have been built, as on European railways, and in a few instances in this country, the considerations governing their choice have been a desire to economize space or to eliminate the turntable with its possibility of tying up all engines in the house when it is out of commission. Neither of these advantages is secured by the Algoma Central design, for the turntable is retained in the center of the house, and by the use of radial tracks the economy of space inherent in parallel track arrangements is sacrificed. The controlling factor in this case was the severe climatic conditions prevailing during the winter months, making it extremely desirable to place all facilities for handling engines under cover and to provide for the economical heating of this enclosed space. In view of the improvements in turntable design and standards of construction, and the fact that the table will always be protected from the weather, the danger of tying up the house by a turntable failure is not worth considering. The slight disadvantage which the house possesses as to the space occupied is also unimportant for the required engine capacity was small, the available space was ample and the radial arrangement of tracks with the consequent wide spacing at the outer ends contributes to economy in working on the engines in the house. The size of the building was practically fixed by the standard roof truss span adopted for the adjacent shops, since by using this standard truss on the engine house as well, at least as large a saving was effected as could have been secured by reducing all dimensions to the allowable minimum. The use of steel for the frame of the engine house is also uncommon enough to attract attention. Reliance is being placed on an English product which is reported to have the ability to preserve the structural steel against injury by corrosion. If such protection can be demonstrated to be entirely adequate for this purpose, it is quite probable that steel construction will be more generally adopted in buildings of this nature.

THE USE OF TORPEDO MACHINES IN ENGLAND

THE Railway Inspecting Officers of the British Board of Trade have recommended the general use of automatic train control (stopping apparatus actuated from outside the train), as noted in the *Railway Age Gazette* two weeks ago. Not only that; they realize the likelihood of delay in reaching an agreement as to what type of apparatus should be used, and under what conditions, and they go on, therefore, to "strongly recommend an extended use" of torpedo placers, controlled by the signals or the signalman, "as a temporary expedient." (These devices are already used in England to a very limited extent.) The inspectors summarize their recommendations as follows:

That railway companies should be urged (1) to take all possible steps to ensure that their regulations are strictly adhered to by their employees, and that the conditions under which the latter work admit of their so doing; (2) to extend the use of track circuit in connection with the control of signals or block instruments; (3) to carry out combined experiments with different systems of cab-signaling and automatic control, with the object of supplementing the present system of semaphore signaling; and meanwhile to extend the use of detonator-placing machines.

The significance of these recommendations lies in the fact that in matters affecting safety on railways, these three inspectors, when agreed, come pretty near to being the mouthpiece of the British government. They are not the Board of Trade, and the Board of Trade takes no radical action without specific authority from Parliament; but the inspectors' opinions are, in effect, the government's guide in legislation. And these conservative officers of the Royal Engineers seem to be not in the least worried about the dangers of "open circuit" schemes. A torpedo machine might be out of order and inoperative, and the failure not be discovered till a train was wrecked; but here we find the machine recommended without qualification. Torpedoes, in enormous numbers, have been and are used in England to repeat the indications of distant signals in time of dense fog; but here the inspectors call for their use in clear weather as well. Moreover, they say nothing about a proceed or "all-right" indication, though the all-right signal of the fogman who attends to the torpedoes, which is given by hand or hand-lamp, is an important element in the "fogging" as practiced in England for the last forty years.

American signal engineers have turned the cold shoulder to the torpedo machine for the reason—or for one main reason—that it is not sure to disclose its own failures. The conservative Englishman is apparently not so conservative as the progressive American. But this is not saying that our British friends are wrong. It is not for an American to criticize them if, instead of looking to this young country, they take their lesson from their near neighbor, France, where one large road, as was recently noticed, has used torpedo machines for fifty years and claims a record of 100 per cent efficiency. This does not mean that the machines have never got out of order; the French officer's statement means, we assume, that they have never failed when needed. The whole system of train running, of which the torpedo apparatus is a part, has never failed in this particular feature; there is no record of an engineman running past a stop signal.

Why is the British government taking this advance step? It can hardly be said that there has been any very marked change in the safety record of the English roads, as regards passengers' lives and limbs. Are enginemen found to be less careful than formerly? Some English railway officers say that they are. Whatever the reason, or motive, this systematic effort or purpose to prevent all collisions is in every way commendable. Of the three recommendations formulated by the inspectors, the first one—the one which, as a preventive of enginemen's errors, the American Railway Association seems to deem sufficient—is, evidently, held to be adequate to meet only a part of the troubles that need to be remedied. To what extent the conditions on the

best American roads are different from those in England cannot perhaps be told with precision; but there will be no dissent from the proposition that perfect conduct in the locomotive cab is as much needed here as anywhere, and as greatly desired. When we get perfect conduct in the cab, or when American railways generally shall have come as near to it as have the Interborough and Hudson Terminal subways in New York, or as near to it as appears to be the case on the Orleans Railway, of France, we can purge our rule-books of that perennial source of perplexity, the flagging rule. At the same time we shall relieve passengers from the annoyance of unnecessary torpedoes and from the midnight whistle that calls in the flagman.

WHAT WE ARE TRYING TO DO

WE published in a recent issue a brief abstract of a paper by John W. Alvord, an eminent consulting engineer, on the subject, "How Can Engineers Best Utilize the Technical Journals?" One answer to Mr. Alvord's question is that neither engineers nor any class of readers can utilize technical papers at all unless they are so edited as to make them really useful. It is a proper function of all classes of periodical publications to publish matter regarding current affairs which has merely the purpose and effect of satisfying the curiosity of their readers as to what is going on. But the trade and technical press has more important functions and to be really useful they must perform those functions.

Their main functions, the functions without which they would have no excuse for their existence are: First, to aid in establishing and maintaining good relations between their constituencies and the rest of the public; and, second, to help their readers to do their work better, and thereby contribute toward increasing the efficiency of industrial and commercial operations.

The *Railway Age Gazette* ventures at this time, with more or less modesty, to say to its readers, that it is trying as hard as it can to perform in the field of railway transportation all of the proper functions of a technical paper. It is trying to satisfy the curiosity of its readers regarding the developments taking place in their field by publishing current railway news. Not only do we have a large department devoted solely to current railway news, but it is seldom that we publish an article, either short or long, which does not possess the element of timeliness. But what we are trying most to do is to accomplish the other two great purposes above mentioned.

A publication devoted to the interests of any class of large concerns cannot at the present time set for itself any more difficult or important task than that of helping them to establish and maintain good relations with the general public. Large concerns of all kinds are under fire; and their future will depend very largely on the kind of treatment they shall receive from the public. Of no class of concerns is this more true than of the railways. It is essential to the establishment of satisfactory relations between the roads and the public that the public shall be to the largest extent possible supplied with all the facts which tend to show how well managed the railways are and what they are doing to promote the interests of the public. But the relations of railways and large concerns to the public are not going to be made and kept satisfactory merely by telling the people how virtuous and well-managed they are. There have been so many disclosures of shortcomings in the management of large concerns of various kinds in recent years that the public knows that the way in which many of them have been managed has been far from perfect, and it is not going to be fooled by partisan attempts to defend what is indefensible. Therefore, publications intelligently devoted to the interests of classes of business concerns which are the subjects of popular discussion realize that they would not render their constituencies the best possible service, to say nothing of doing their duty to the public, if they told merely the good things their constituencies did or tried to defend everything that they did, or even if they told and defended only what they did that was defensible and passed over in silence the things that they did which were not defensible. If

a publication devoted primarily to the interests of a particular class of concerns is to be of any real service in establishing satisfactory relations between its constituency and the public, it must frankly and courageously criticize its constituents when it thinks they do wrong, as well as defend them when it thinks they are unjustly attacked.

Intelligent and friendly criticism from such a source is, or ought to be good for those who receive it, and probably it also tends to cause the general press and public to respect and be convinced by what publications having expert knowledge say in extenuation or defense of the methods and policies of the concerns with which they are closely identified.

It is for these reasons that the *Railway Age Gazette* follows the policy of not only defending railway managements when it thinks they are unjustly criticized, but also of criticizing them when it thinks they deserve it. There have been cases where railway men have found fault with this paper, because they have thought either that things which it has said were unjust to the railways or were things that should have been left to be said by other publications if they were to be said at all. But it has been a cause of satisfaction and encouragement to us that apparently a large majority of railway officers have endorsed our policy of saying at all times what we have honestly thought, and there can be no question that if this paper is contributing toward establishing better relations between the railways and the public, it is chiefly because it does follow this policy.

As important as is the work of a trade or technical paper in helping to establish good relations between industries with which it is identified and the public, of yet greater importance is its work of helping to increase the efficiency of the management and operation of the concerns in its special field. The *Railway Age Gazette* has decided that it may best do this in its field, by keeping in close touch with the problems of those actively engaged in practical work for railways and railway supply concerns, and then making its columns a clearing house for the exchange of the best ideas and the most illuminating experiences of these practical men; and this is the chief thing that we are trying to do. For example: One of the main problems of railway operating officers is to get more effective service out of freight cars. The ton miles per freight car per day and year are too small, and one of the principal reasons is that cars are not handled expeditiously enough in classification and terminal yards. It seemed, therefore, that the handling of cars in classification and terminal yards was a subject needing thorough discussion, and it was to secure this that we advertised sometime since for papers on the handling of cars in classification yards, and that we later advertised for papers on the handling of cars in terminal yards. Articles on the handling of cars in classification yards were published sometime ago, and, it is hoped and believed, proved of much value. More recently a large number of very able papers on the handling of cars in terminal yards has been received. The first of them was published last week, and the rest will follow in later issues. It was to contribute what we could toward increasing efficiency in railway mechanical departments that our *Mechanical Edition* was established; and it was to contribute toward increasing the efficiency of maintenance of way work that our monthly *Maintenance of Way* section was established. We believe the various discussions of means of increasing efficiency have accomplished their objects because they have been participated in by railway men who are among the best equipped in the country to deal with the subjects on which they have written.

The extent to which a publication such as this can be made of real practical value depends, however, very greatly on the extent to which it secures the confidence, support and co-operation of its readers. We have the co-operation of our readers to such an extent as to encourage the hope and belief that we have their confidence. But, we venture to confide to them that if they are satisfied with the *Railway Age Gazette* and what it is doing they think better of it than its editors do. We think we are getting out a good and useful paper; but we are but too well aware that it can be made much better and more useful, if the railway men of the country will help us. The best way they can help us, and

thereby help themselves, is to make the *Railway Age Gazette* more and more a clearing house for their own ideas and experience.

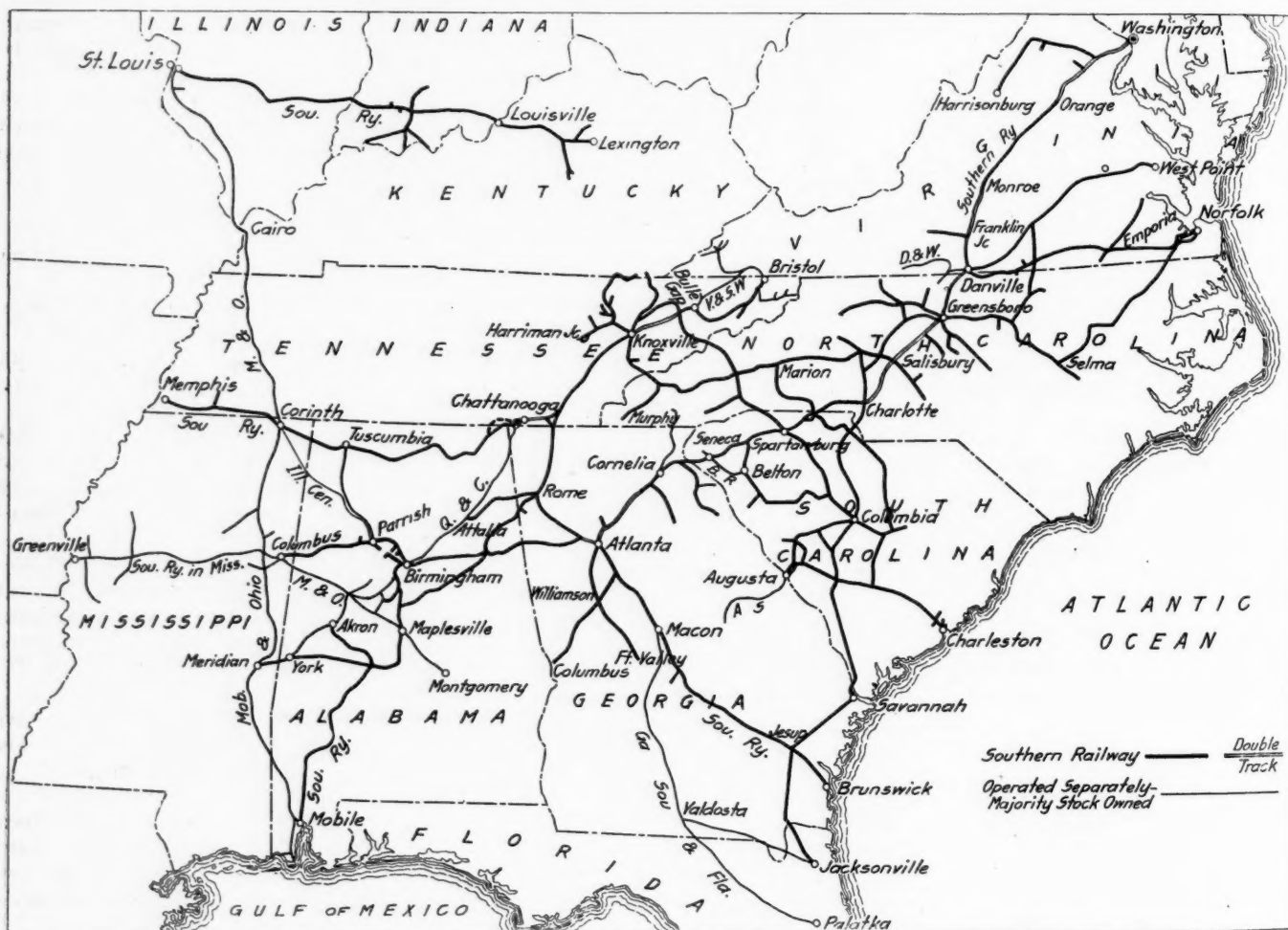
Gentle reader, we are doing our level best for you, but you can help us do better for you. If you have any suggestions to offer or any criticisms to advance, which you think might tend to help us to make this paper more useful to railways and railway men, don't hesitate to communicate them to us. What we are trying to do is to make every issue of the *Railway Age Gazette* such that it will be of real practical service to men in every rank and branch of the railway organizations of America.

SOUTHERN RAILWAY

THE south is at present seriously affected by the European war principally, of course, because of the difficulties of financing and selling the cotton crop. While the prosperity of the rest of the country has had both ups and downs since 1907, the prosperity of the south has grown steadily during these

seed, hulls, meal and cake, and oil was an additional 2.73 per cent. Since, however, the price received for the cotton crop represents a large proportion of the income of a great number of people in Southern Railway territory, the loss in revenue to the railway from the inability of the cotton planters to sell their cotton is by no means measured by the loss that would result from the non-movement of 5 per cent of the total tonnage. On the other hand, since the growth in prosperity, both of the Southern Railway and the people served, has been sound, the problem presented by the cotton situation is one which, if met in the proper spirit, should entail but a temporary loss and may in the long run have actually beneficial results, in that it may lead to more diversified agriculture in the South. How the situation is being met cannot be better expressed than in President Fairfax Harrison's own words in the annual report to his stockholders:

The loss in revenue since the beginning of the European war and the outlook for the immediate future have demanded a strict policy of retrenchment, always a disagreeable duty. The consequent reduction of service



The Southern Railway System

years and this growth has been sound as well as rapid. One of the most, if not the most, important factors in this growth in prosperity has been the improvement, both in aims and ideals and in actual quality and quantity of service, of the transportation system of the South. Even in the fiscal year ended June 30, 1914, there was no serious interruption to the Southern Railway's progress. Total operating revenues amounted to \$69,534,000, an increase over the previous year of 1.47 per cent; expenses amounted to \$18,963,000, an increase of 6.38 per cent over the previous year; and after the payment of taxes and interest there was available for dividends \$4,840,000 as against \$7,079,000 the year before.

The actual tonnage of cotton carried by the Southern Railway is not a large percentage of its total tonnage. In the fiscal year ended June 30, 1914, it was but 2.48 per cent, and the tonnage of

of employees means a reduction of the opportunity of many men to earn the livelihood to which they have been accustomed, and it has seemed fair to the officers that they too should share the sacrifice, so that as a temporary measure the salaries of all officers earning in excess of \$2,500 per annum have been voluntarily and loyally reduced in fair proportions. Under these circumstances the board has deemed that it was fair also for the preferred stockholders to share the necessities of the situation. Accordingly, although the full 5 per cent on the preferred stock was safely earned for the year before the current acute conditions were apparent, the dividends declared for the year were reduced from 5 per cent to 4½ per cent. Furthermore, the dividend for the second half of the year was declared payable not in cash but in scrip, redeemable in five years and meanwhile bearing interest at the rate of 4 per cent per annum.

To judge adequately of the results of operation of a great railway property like that of the Southern in one year as compared with another it is essential that a general picture of the property, the requirements of its service and the sources of its

income be kept vividly in mind. The company operates 7,010 miles of road, the greater part of which is a network of branch lines connecting one community with another, built originally in the majority of cases irrelevantly to any general scheme of transportation. To have operated this great mass of intersecting mileage as separate local lines would have not only been impossibly expensive if any kind of service were to be given, but it would have failed utterly to develop the natural resources of the country and of its people. The line running from Washington to Atlanta naturally forms a main artery of traffic on which the movement of both freight and passengers must be uncongested and performed so economically as to offset the cost of running trains on branch lines where traffic conditions make such operation unprofitable, although such operation is necessary to meet the requirements of public service. The old main line of the Southern Railway was single-track, 60 and 70-lb. rail, with an almost constant ascending or descending grade of 1 per cent. The Washington-Atlanta line now is about two-thirds of it double-track, the total road mileage being 649 miles, of which about 400 miles has double-track. The double-track is stone ballasted, laid with 90-lb. rail, and has a maximum grade of 0.5 per cent. Arrangements have been made for the completion of this double-track work and the company has available for sale to pay for this work \$20,000,000 Atlanta & Charlotte Air Line bonds. This capital expenditure on betterment of the main line, although the most expensive single piece of work, is typical of the policy of improvement which, however, must of necessity proceed only so rapidly as can be justified by increasing business as a whole.

Mounting expenses have been one of the great problems of the Southern Railway as of other railways. One source of increased expense deserves special mention. Taxes in 1914 amounted to \$2,679,000, an increase of 8 per cent over the previous year. This is out of all proportion to the increase in railway revenues or increased land values in the South and shows a shortsighted attitude on the part of the public authorities that in time public opinion ought to correct. Nevertheless, the management has consistently stuck to its conviction that the growth of the railway property and the growth of the prosperity of the people served were so intimately connected that nothing which adversely affected the one could fail to be reflected in adversity to the other. A retrenchment which meant a saving in dollars and cents directly to the railway company, but which adversely affected the ability of the people served to make the most of their opportunities was a shortsighted economy.

This is rather strikingly illustrated in the train and traffic statistics for the fiscal year ended June 30, 1914. It is axiomatic that the shipper does not suffer, but that the railway does gain in economy in proportion to the reduction in train-miles of freight trains necessary to handle the total freight business.* This statement, however, does not apply to passenger business. Frequency of service, especially in local passenger service, may be of even greater importance to the community than the speed of trains. It is not enough that all the people who desire within the week to go from Athens, Ga., to Lula should within the week have a train provided for them. It is this fact that the Interstate Commerce Commission, apparently, ignores in its theoretical dictum that each branch of the service should bear its share of the total expenses. Where extra passenger-train mileage is the result of competition, a reduction in this mileage is generally a profitable economy for the railroad and not a loss to the public; but a reduction in passenger-train mileage which represents an impairment of service, even where the service is unprofitable, or a failure to increase passenger-train mileage to meet a reasonable increased demand for it, even where such additional train mileage is not profitable, is an uneconomical economy. This at least is the view that the Southern Railway management takes and it might be called the statesmanlike way of regarding rates and service as contrasted with the Interstate Commerce Commission's leaning theoretically toward making each branch of the service pay its own way.

As an illustration of what the Southern Railway is doing, the number of passengers carried one mile was 888,300,000 in 1914, an increase over 1913 of 5.15 per cent. Passenger-train mileage was 18,362,000 in 1914, an increase of 5.63 per cent, with, however, a considerable decrease in mixed-train mileage—887,000 mixed-train miles in 1914 as against 999,000 in 1913. The total number of ton-miles handled was 4,584,000,000 in 1914, an increase of 0.15 per cent. The freight-train mileage in 1914 was 15,756,000, a decrease of 5.31 per cent, with a decrease also, it must be remembered, in mixed-train miles; and an even better showing is made by the decrease in freight-train locomotive mileage, the total in 1914 being 16,586,000 miles, which is less by 5.81 per cent than in 1913. In this connection the fact pointed out by President Harrison that passenger train-miles for the year aggregated over 52 per cent of the total revenue train-miles and exceeded the total freight-train mileage by 2,607,000, while revenue from passengers was but 27.62 per cent of the total revenue from transportation, is striking. It will be seen, therefore, that the proportion of trains to travelers was maintained in 1914, the average number of passengers per train being 46 in both 1914 and 1913. On the other hand, the trainloading of freight was materially increased. The revenue freight-trainload in 1914 was 275 tons as against 260 tons in 1913, an increase of 6.14 per cent, and the total trainload, including company freight, was 339 tons in 1914 as against 321 tons in 1913. The trainload is not small when we consider the proportion of train-miles run on main line to the proportion of train-miles run on branch lines.

The total tonnage carried in 1914 was 29,650,000; in 1913, 29,450,000. The average length of haul was 155 miles in both years. The average ton-mile rate was 9.83 mills in 1914 and 9.82 mills in 1913.

The economies in the handling of freight would have been in 1914 more clearly reflected in comparative transportation expenses were it not for two principal factors—increases in wage scales and the addition of passenger trains and passenger train-mileage—which offset these economies.

Total transportation expenses in 1914 amounted to \$25,052,000, an increase of \$1,447,000 over 1913; but of this increase \$566,000 was an increase in payments for injuries to persons, so that leaving out this probably abnormal factor, transportation expenses increased but 3 per cent.

Maintenance of way was \$8,780,000 in 1914 as against \$9,040,000 in 1913. In addition there was spent for what the Interstate Commerce Commission classifies as additions and betterments, but which the Southern Railway management considers expenditures for upkeep, \$2,540,000 in 1914 as against \$2,083,000 in 1913.

The Southern Railway is particularly fortunate in having financed its immediate needs before the European war began. At the end of the year the company had on hand \$15,393,000 cash, with total working liabilities of \$13,892,000, which included but a nominal amount—\$455,000—of loans and bills payable. During the year the company sold \$10,000,000 3-year 5 per cent collateral notes and \$1,250,000 first consolidated mortgage 5 per cent bonds. The net increase in outstanding bonds and notes was \$11,226,000, and in equipment trust obligations, \$3,238,000.

The following table shows the principal figures for operation in 1914 as compared with 1913:

	1914	1913
Average mileage operated.....	7,033	7,036
Freight revenue	\$45,077,048	\$44,943,748
Passenger revenue	19,004,783	18,220,489
Total operating revenues	69,533,697	68,529,490
Maint. of way and structures.....	9,098,912	9,275,553
Maint. of equipment.....	11,974,090	11,290,337
Traffic expenses	2,243,556	2,094,010
Transportation expenses	25,051,780	23,605,046
General expenses	2,202,836	2,008,977
Total operating expenses.....	50,571,175	48,273,924
Taxes	2,679,390	2,480,387
Operating income	16,310,958	17,855,715
Gross income	19,578,364	21,221,686
Net income	4,839,706	7,078,625
Dividends	2,700,000*	3,000,000
Appropriations for additions and betterments	91,929	48,660
Surplus	2,047,777	4,029,965

*The semi-annual dividend on the preferred was reduced in second half of the year from 2½ per cent to 2 per cent and was paid in scrip and not in cash.

*This is assuming, of course, that there is no undue delay in handling commodities moving to market. There was no such delay on the Southern.

Practical Hints on Operation of Terminal Yards

Second Series* of Papers Discussing This Subject
from Standpoint of Yardmaster and Superintendent

SECOND PRIZE—REGULARITY THE FIRST ESSENTIAL IN THE OPERATION OF A TERMINAL

By F. LINCOLN HUTCHINS

Baltimore & Ohio, Baltimore, Md.

The basic principles of terminal operation are simple, but their application is difficult because of lack, or inconvenient layout, of tracks and warehouses; irregularities in road service; unfavorable power conditions; orders for special services; or lack of support on the part of superior officers.

The most important requirement is order and regularity. Run of business settles into a rut in which it continues with but few and infrequent interruptions, season fluctuations here being considered as regular. All yard work should follow its regular routine until some irregular occurrence makes necessary the master's direction. That terminal is necessarily inefficiently operated and is most easily disorganized and thrown into confusion, where the directing head has to give orders for details of ordinary routine. The criterion by which to judge of the qualifications of a superintendent of terminals or of a yardmaster, is in the minimum of direct attention he is obliged to give to the ordinary details of operation.

At the outset conditions must be made to secure the greatest degree of order and regularity. Patrons must be made to understand that yard work, to be effective, must be in regular routine, that their requests for cars, switching, or forwarding, may not be attended to at any time to suit their convenience, but that they must anticipate their needs and give such timely notice as will permit of doing their work in the regular order laid down for the guidance of the switching crews, with the assurance that only in this way can they be best served all of the time. Interference by traffic, or other, officials with such orderly procedure leads to a demoralization of the work, and prevents adherence to schedule performance, if indeed it does not prevent the adoption of any schedules for the work. Such interference greatly increases the terminal costs; increases which cannot be located in any item and consequently are undiscoverable in any analysis of costs.

In all railroad operation time is almost the most important element and particularly so in all yard work; hence a good yard superintendent will know by actual study the standard time for all the different operations and hold his subordinates as closely thereto as may be possible. It is entirely practicable to determine the average time for breaking up trains, making deliveries to each particular siding, switching at houses, industrial layouts, private tracks, stock yards, icing, weighing, and to secure the actual time used in each of these services with the number of cars handled in each.

Records are necessary to the efficient operation of any terminal. Its superintendent should have placed upon his desk at regularly stated times a tabulation showing not only the work done as a whole, but the efficiency of each switching crew. Unit records, made contemporaneously with the work, are simple and feasible, while tabulations are cheaply made by sorting and entering upon properly prepared tables. The use of tickets, similar to the transfer slips used by trolley car conductors, provide a cheap and effective means for the making of such records.

Employment of men is a matter of the greatest importance, yet one which has received scant attention. Because a man has two arms and two legs is no sign that he will make a good yard man. There are certain simple tests which will very clearly determine a man's characteristics and these should be applied before setting the man at work. The personal injury column would be largely reduced were men of careless disposition eliminated, to say nothing

of avoidance of rough handling and errors of other kinds.

The foundation of discipline is found in an even observance of justice as between man and man. The man who allows his digestion to affect his treatment of those under him, or who does not recognize their individuality, cannot secure that discipline that is requisite in all railroad work. Treatment of men as though they had sold their individuality for a per diem is a most expensive method, while interested consideration of the welfare of subordinates pays large dividends.

The qualifications necessary for the efficient control of any terminal are: a thorough knowledge of conditions and requirements of operation; love of order and regularity; love of justice and the "square deal"; tact in handling men, both employees and patrons; resourcefulness in emergencies, and ability to secure and use records, and men with all these qualifications are entitled to adequate remuneration.

Upon large systems it is not enough to have competent men in charge of its terminals. There should be a staff of men familiar with conditions and methods at all terminals. A competent man with good observing powers, having the all-round information which a study of all the terminals would give him, would be able to suggest efficiencies now undreamed of and to reduce the unit costs which have grown to such large proportions during the past decade. He could formulate a code of best practices and assist in establishing schedules and standards of operation.

The breaking up of trains should proceed as fast as the trains arrive, if that be possible, so that the receiving tracks may always be open for incoming trains. The neglect of this has been a fruitful cause of special orders to make quick delivery of cars arriving upon different trains at different times, when they have been allowed to accumulate upon the receiving tracks. A regular order for handling all rush cars containing perishable, or immediate demand, freight should be adopted and no interference with it tolerated. This is particularly true if prompt delivery of all such business is to be maintained. An order for special service for one consignee will seriously interfere with the orderly delivery of all other similar consignments, even if it does not affect materially other routine.

As it takes no longer to marshal cars before, rather than after they are loaded, all cars for outbound freight houses should be put in order for forwarding before being placed in the houses. This provision adds to the surety of proper loading, as the cars for certain points will always be at the same berths. The freight house men soon learn the location of these cars and misloading naturally diminishes. It also permits of the localizing of receiving doors, so that shipments may be received at points nearest the cars in which they are to be forwarded. These houses and perhaps warehouses are the only ones which should have stub tracks.

Cars should flow regularly from the breaking up tracks into the tracks leading to inbound freight houses, which should have a slight downward grade so that freight house men can bar them along as needed, thus saving the attendance of a switching locomotive and crew; the only requirement being the removal of all empties before they block the house tracks.

Switching upon team tracks should be done at definite times, even if two, three, or more pullings should be established during the 24-hour day. Such times should synchronize with the business habits of the community so that the disturbance of cars upon these tracks may come at times when least used by patrons and also at such times as loading, or unloading, naturally finishes. Switching at other times leads to waste of car time in that it increases the time of empty cars upon these tracks, prevents the opportune setting of other cars and reduces the time of customers for loading and unloading.

*The first prize article submitted in the recent contest on this subject was published in the *Railway Age Gazette* of October 9.

At junction points there should be reciprocal relationship with the head of the connecting terminal in order to secure an efficient transfer of cars. Frequent consultations will do much to smooth out the little frictions before they become large enough to interfere with the orderly flow of traffic. Much may be gained by both roads if their respective terminal heads will endeavor to so deliver cars as to make it easier for "the other fellow."

In marshaling trains for forwarding we again have the necessity for regularity as it results in trains being made up and ready for the regular calling of the crews and the elimination of costly delays in the yard. Yard and despatching forces need to work in harmony in this respect. Fifteen minutes waiting for crew is very much more economical than crew waiting 15 minutes for train.

In transferring heavy freight there must be co-operation between the freight house and yard forces, and a man should be put in charge of this work who can bring about such co-operation. Exact records of costs of this work, put up to the proper official, often lead to a cure of the causes making such transfers necessary, especially when the cause is bad loading.

In conclusion, the efficient operation of any yard can be determined only by intelligent study of that yard, the introduction of schedules with standards of performance, and the setting up of unit records of actual results to compare with the standards. Supplementing this there is need for some one to be familiar with all terminals, whose whole duty is to secure the most efficient yard operation throughout the road's territory.

THE ADVANTAGES OF A CAR DESPATCHER

By D. S. FARLEY

Division Superintendent, Atchison, Topeka & Santa Fe, Kansas City, Mo.

The operation of a large terminal yard is very similar to flowing water. If obstructions are placed in the stream the water dams back immediately, and if there are enough obstructions, disaster occurs. If business is well handled and the system perfect, cars move through without delay or confusion; the shipping public is satisfied and the management is pleased. But let the system be poor and the organization bad, cars go wrong, and delays follow, the stream is dammed, confusion ensues and then follow bad feeling, diversion of business and a generally deplorable condition. The two most essential things to obtain the best results are organization and system.

ORGANIZATION

To get the best results the superintendent in charge of a terminal must surround himself with loyal and competent men. Once having formed an organization he must outline his policy to his subordinate heads and then leave it to them to obtain the results. No two men can run the same job at the same time and no two men ever do things in the same way. By placing the responsibility squarely up to the individual, it tends to make him use his own head at all times, and he will manage to overcome difficulties that otherwise would stall him. A man that cannot or will not assume responsibility should be dispensed with, not only for the good of the service, but also of the man himself.

A system of reports, daily, weekly and monthly, can easily be arranged which will keep the superintendent advised of what is being accomplished, leaving him time for more important things. The superintendent who tries to handle detail places himself in the class of cheaper help, or, in other words, he is being paid a superintendent's salary for doing work that the messenger or a clerk could do, leaving the office of superintendent vacant.

Frequent meetings of all heads of departments, preferably weekly, should be held in the superintendent's office to discuss matters of importance and a free discussion should be indulged in by all. The superintendent can well afford to have his department heads understand that he is having such meetings in order to get the benefit of their ideas, and any new ideas advanced should be given careful consideration. Such meetings do much to bring about harmony and good feeling, eliminating the old and erroneous departmental feeling, and help the service wonderfully.

They make each man feel that he has a personal interest in the welfare of the company and that he should remove all obstacles that make it hard for another department to do business. Once such a feeling exists among the heads of departments, it will permeate the lower classes and business will be handled with the least expense. In other words, through a good organization of loyal men, economy of operation can be reached and through no other way.

The superintendent should be very careful in his discipline, to be sure that he has all the facts before him before he assesses discipline. A kind talk to a loyal and well-meaning employee, pointing out his error, will make a better and more loyal man, while a harsh letter of reprimand may destroy his loyalty. Habitual carelessness should not be tolerated, but no man who can be made into a good man should be dismissed, unless the case is so grievous that it would be bad policy to retain the culprit in the service.

SYSTEM

So far as possible there should be a time for doing everything and a set way of doing it, that is; a regular time should be made for transfers from one yard to another, deliveries to connecting lines, setting of the house, pulling and setting team tracks or handling industries. Emergency cases of course will occur which will necessitate some variation, but it is surprising how few exist when a regular system has once been adopted. When a time is set for doing work and all understand the work to that time, it eliminates special runs, leaving the power that would be so occupied, to do its regular work. This reduces overtime and moves the business with regularity.

Each yardmaster should be assigned a yard or territory, over which he has control so far as the handling of the business is concerned, and he must understand that he will be held personally responsible for the proper handling of all business through that particular yard or territory. The yards should then again be divided into yard clerk's or yard checker's territories, and they should understand that they must keep a complete check of their territory and not allow cars to be delayed for any cause. They will make reports as directed by the offices and work directly with the offices on the telephone, or with the yardmaster in their locality.

In the superintendent's office there should be a car despatcher, who will keep a check from reports sent him, of all movements. On inbound business, the bills or their equivalents should be kept on the inbound carload desk, for every car until some disposition is given for it. As soon as disposition is given, the bills should be removed from the case and the car ordered and carded. At regular intervals, a report of all cars ordered, showing the number, initial, contents and destination, should be given to the car despatcher in the superintendent's office, who will copy these onto a sheet which he keeps constantly before him, until the car reaches its destination. If a car does not reach its destination, be it an industry, a connecting line, house or team track, the despatcher should consult his last location of the car, and reach the yard clerk by telephone, in whose territory it was last reported, keeping on until he locates it, and then keeping after the yardmaster until it is moved. A delayed car should be given preferred attention. The yard clerk's reports must go to the car despatcher in the superintendent's office where delays, movements of cars, etc., can be checked, and reports should be made frequent enough to permit of every car ready to move, being traced by the despatcher quickly enough to prevent serious delays.

Under normal conditions 95 per cent of all cars in a terminal move with regularity, but the 5 per cent are the ones which become lost, placed on sidings, overlooked or delayed, causing complaints, claims, correspondence, bad feeling and diversion of business. Let one car be delayed or poorly handled, and it will cause more hard feeling than can be offset by the perfect handling of 99 other cars. The yard checks turned in to the despatcher makes it possible for him to keep after delayed cars and keep them moving before they have caused trouble. By this plan it will be noted that every car, regardless of its contents or importance, has a

tracer after it. The same plan should be followed on outbound cars.

Each day's reports when completed should be closed up and filed for future reference. These records will give a complete history of the movement of every car through the terminals, and will furnish valuable information in handling claims and other correspondence, as well as eliminate a vast quantity of unnecessary correspondence. The completion of these daily sheets consists of showing every car at its destination, the time ordered, time set and the average time in moving. If bad order, the time consumed in getting to and from the repair track and the time on this track; if held for any purpose, the time and reason therefor. This furnishes the superintendent immediately, information concerning delays which otherwise might go on for a long time and do much damage before being corrected. Also, these reports are totaled and averaged, which gives him a correct idea of the average time consumed in switching the entire terminal or any part thereof.

The cost of maintaining the dispatcher's force is more than offset by the elimination of expense in other directions. As all cars move promptly and in regular connections, the old plan of making special moves to get some delayed car to its destination is eliminated. The prompt moving of all business stops correspondence, not only with the public, but among the employees. In special cases where the detailed handling of a car is asked, the information can be given immediately from the dispatcher's sheets, as

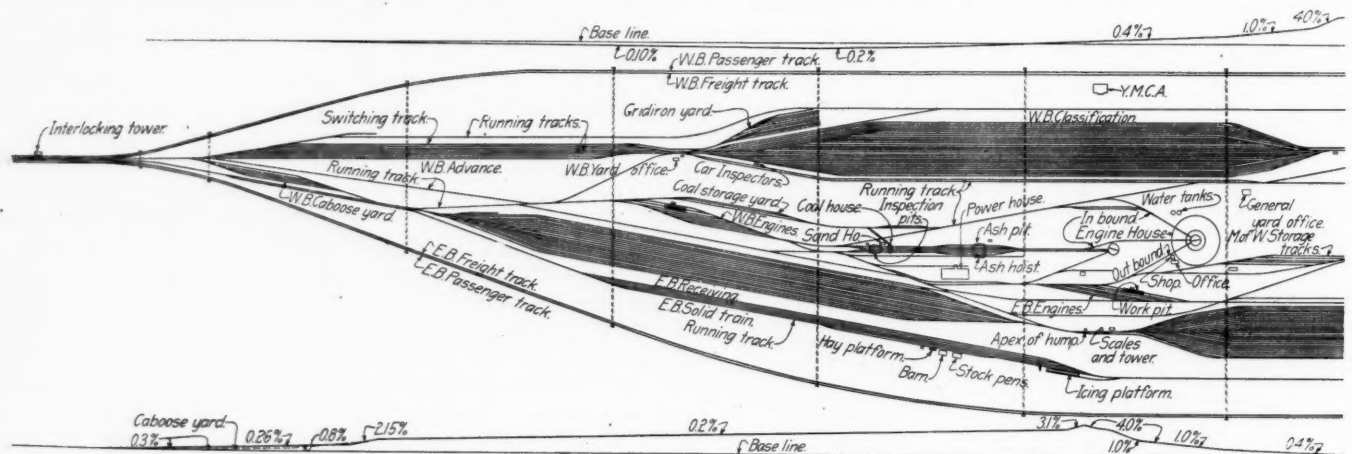
the resourcefulness and alertness of the officers in charge.

2. That under normal conditions it takes about as long to move a car of freight through one terminal as to haul it 100 miles in road movement. Were it not for this condition, thousands of freight cars would be available in times of shortage which are now tied up in their snail's pace movement through our terminals, and thousands more would need never have been built.

3. That approximately 70 per cent. of the total freight transportation expenses pertain to the direct cost of yard and road movement which represent about 35 per cent. of the total operating expenses chargeable to freight. In view of the strategical position of our yards in the movement of traffic, this percentage has added significance and becomes worthy of equally as much careful research and highly trained thought as is devoted either to the maintenance of way or motive power departments. On how many railroads is this attention given to the science of transportation—to road and yard operations? It should be noted by comparison that M. W. & S. expenses run about 20 per cent. and M. P. expenses 25 per cent. of the total operating expenses.

While we cannot, then, prescribe a formula for yard practice, there are a number of controlling factors that deserve special emphasis, and which demand as much training and thoughtful study as each of our organizations can acquire.

Road Power and Engine Terminals.—The necessity for ade-



A Suggested Design for a Large Classification and Terminal Yard at the Junction of Four Main Line Divisions

they show the entire handling of the car from the time it is ordered until set, and the cause for any delays it may have encountered.

ANALYTICAL STUDY OF YARD DESIGN AND OPERATION

By J. H. HOPKINS

Pennsylvania Lines West, South West System, Columbus, Ohio.

To the practical man in railway transportation the operation of terminal yards is a factor too variable to fall within the scope of those phases of the railroad problem for which "plans and specifications" may be drawn up and a standard practice adopted with higher efficiency as its aim. Each location of a terminal yard, each breaking-up point for through traffic has its own difficulties for solution dependent upon a variety of influences.

So we find every yard becomes an individual study in transportation efficiency, and as has been suggested, in public service. That this involves a vital factor in our transportation problem we need only be reminded:

1. That terminal yards are the gateways through which the entire volume of our freight traffic must pass and when we allow any of these gateways to become clogged, the whole train of traffic on one division, or as frequently happens, on a number of adjoining divisions, becomes affected, perhaps completely paralyzed, depending upon the severity of the blockade and

quate road power and engine terminal facilities is of first importance if a yard is to be kept open and receiving tracks clear for the free entrance of incoming trains. One will frequently hear the yardmaster say "Take the trains from me as fast as made up, and I can classify all that arrive without holding them out." To do this we must have ample power for outbound movement, and, equally as important, engine facilities that will insure the prompt handling and preparation of the locomotives. It is wasteful to have an excess of power to offset the unnecessary delays in preparing engines for service. The design of engine terminals should provide for such water, coal, ash pit, inspection pit and turntable facilities, and track arrangements that engines will move through in minimum time and with least interference to traffic.

Yard Power.—Yard power, more frequently proving inadequate as to quality than quantity, is a feature too often neglected, resulting in locomotives unsuited to the work required, and in frequent interruptions to classification as well as industrial work, a loss which is always permanent, offset by no advantages whatever. The amount of time lost in switching with old and wornout power frequently breaking down in service, or with engines too light for quick movements with average loading, is more than we often realize. Using such power at busy points is a false economy, too commonly practiced. More particularly should this be guarded against at outlying points or intermediate yards through industrial districts where shop facil-

ities are lacking and engines must be run to the nearest terminal for light repairs of almost any nature. Inconvenience to manufacturer, interruption to work and loss of crews' time are, in such instances, aggravating and costly to all concerned.

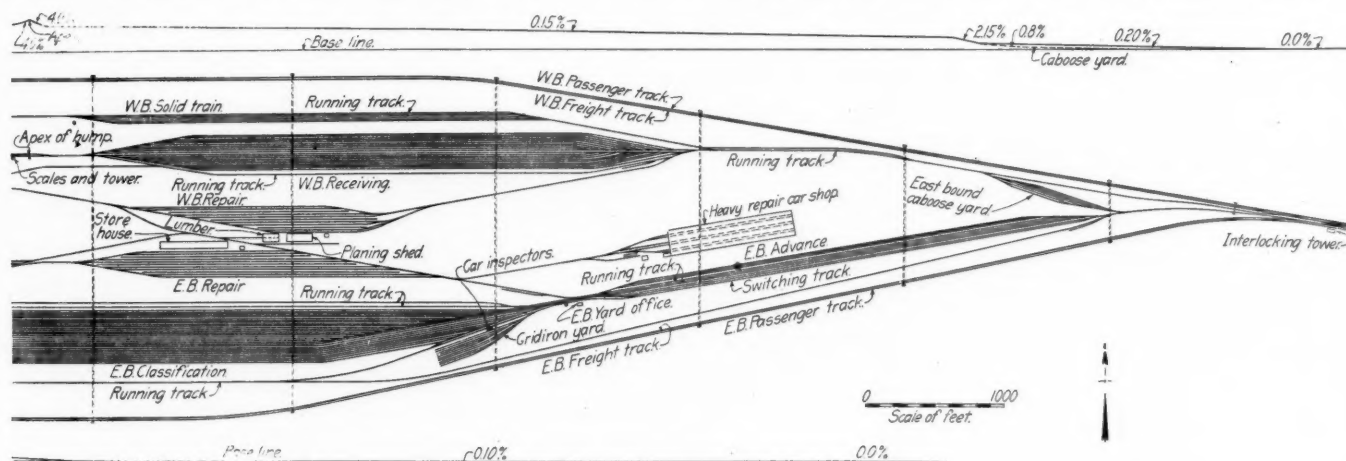
Yard Design.—The design of a yard, like its operation, is dependent on too many indeterminate factors to allow of a standard plan, even for yards of the same type. In the accompanying diagram, drawn to typify an ideal arrangement for a large classification yard at the junction of four divisions, some salient features may be mentioned as applicable to any terminal of this character or of less extensive proportions.

Attention is called to the arrangement of engine terminal and running track facilities to avoid conflicting movements and the crossing of traffic wherever possible. The grade of receiving yards, while depending often on the contour of site selected, should approximate, where possible, the ruling grade of the division over which incoming trains arrive. In this way the road engine performs a good share of the work of lifting the cars up to the summit for gravity switching. The yard power then required to shove trains over the hump will be considerably less than were the receiving yard level with a sharp rise to the summit. The apex of the hump should be placed sufficiently high to give an effective fall through the ladder tracks to the classification yard, and thence a continuing grade which will carry cars as far along as desired. The hump profiles shown on the accompanying diagram have been designed to give this

pulling out tracks from the classification or advance yard so as to facilitate movements to the main line and clear the yard as rapidly as possible after road engines are coupled on and air tested. Advance tracks should be provided to allow for emergency room where trains cannot be taken promptly by despatcher, for classification tracks must be cleared to avoid blocking operations at the hump.

Where road engines get their trains from the classification yard it is not necessary to have yard power to haul the cars to a departure yard. At large yards this will save two engines at each classification yard. This plan requires that classification tracks be of 50 per cent greater capacity than that required to hold the maximum train, and the grade of tracks must be such that cuts will run freely and couple up to cars ahead. While it is true that with this practice the engine provided for returning car droppers will be needed often to make couplings and shove down cuts, and that a road engine will occasionally meet some delay in throwing out shop cars or the like, it is doubtful whether these drawbacks offset the saving of yard power that can be effected where the classification yard can be designed with the proper grade and sufficient capacity for this method.

Where yards are located on single or double track railroads, it is important that freight running tracks should be provided at either end of the yard that outbound trains may get away promptly and the throat not be congested by holding trains for



A Suggested Design for a Large Classification and Terminal Yard at the Junction of Four Main Line Divisions

ideal condition as nearly as possible, though it is realized that such factors as loaded and empty cars, difference in rolling resistance, and the season of the year are important influences to be reckoned with. With this design a second hump engine should be unnecessary under normal conditions where the train of a single road engine is to be handled.

The grouping of ladders to the classification yard in the double fan style here shown enables the cars to reach the clearance point at a minimum distance from the hump, insuring more rapid classifying and avoiding the danger of blocking the ladders, a frequent trouble where cars must run long distances to clear, and the short, steep grades near the summit cannot be carried with safety a greater distance.

The gridiron yards shown at the ends of classification yards afford a place to classify local cars in station order after having first drilled them indiscriminately onto one or more classification tracks. It will be noted that this work can proceed without interruption to trains pulling from the classification yard, or to other movements to advance tracks located each side of the two pulling out tracks.

The caboose has long been the yardmaster's annoyance, and often will take more time to "classify" than the whole train which it follows. The scheme shown on accompanying plan provides a simple, effective means of disposing of the cabin car at entrance of receiving yard as the arriving train pulls in.

An essential feature in yard design is the arrangement of

movement on the passenger tracks where any appreciable amount of this class of service is encountered. The length of such outbound freight tracks will depend largely on the grades, railroad crossings, or other interfering factors that tend to retard road movement. Freight tracks to take care of inbound movements are not so important where the humps can keep clear receiving tracks at all times, and this in turn will depend largely on the prompt despatch of outbound trains, which is the keynote to efficient handling of any terminal.

Industrial Yards.—The value of regularity in switching at industrial plants may be realized as often in the increased business diverted to the line affording most reliable and efficient service, as in the freedom from blockades and congestions which run switching costs away up, with reduced capacity for service, and lowered efficiency of the plants both of railroad and manufacturer. A little foresight on the part of a yardmaster and adequate supervision from division headquarters would often avert such paralyzing of business as has too frequently occurred during periods of heavy traffic. Yards serving industrial territory should never be too crowded for the most expeditious handling and disposing of cars, and the heavier the business the more care should be exercised that the switching work is not hampered. The reverse is too commonly true, so that as business increases, the facilities for doing it are reduced or worked at a disadvantage, with the effect of increasing the congestion until an embargo is called or freight is set off at intermediate points,

to the interference of other operations and adding much to the expense of final delivery.

The loss in claims, detention of equipment, providing of extra switching power, interruption of road movements, and actual losses of business will run into thousands of dollars in an amazingly short period by failure to act quickly and decisively at the strategic time.

In conclusion, it might be said that the four factors most essential to the efficient operation of terminal yards are:

1. Adding to the services of the practical yard man that exhaustive study and special training which have accomplished so much in the maintenance and mechanical departments.

2. Providing adequate motive power and facilities for caring for it, that our yards may be free from congestion and able to take trains as fast as they arrive.

3. Giving design in each instance the subject of all possible care and study, with a view to providing track facilities commensurate with the business, and so arranged that movements across or against the traffic will be avoided wherever possible, and switching will not be interfered with by trains arriving or departing or by other operations within the yard.

4. Assuring regular and adequate service to industrial plants, that their deliveries may be made as fast as they can be prevailed upon to take them, at all times guarding against a surplus of cars that will cause congestion, reducing the capacity of switching power, and thereby threatening a blockade, the thing most to be avoided if we are to look for high efficiency in operation and give reliable service to the public.

SYSTEMATIZING YARD OPERATION

By F. H. GARNER

Transportation Inspector, Union Pacific, Omaha, Neb.

Many things enter into the successful operation of any large industrial terminal. The first and most important essential is to have the proper man at the head of the terminal organization. The general yardmaster in charge of a large freight terminal should not only be a man who can handle men and who thoroughly knows every detail of the operation of his yard, but he must also be an executive, and a diplomat in the handling of the patrons of the line. In order to operate a large yard successfully a general yardmaster must have absolute charge of operation. I find that in yards where the general yardmaster reports direct to the superintendent the results are much better than in yards where he reports to a local agent or to a trainmaster. The interference and supervision of a trainmaster in large terminals has never helped anyone, but, on the other hand, has tended to disorganize the organization.

The yard clerks should all report to the general yardmaster. A mistake is made at some terminals by having the clerical force report to the local agent. A yardmaster should have sufficient clerical help to properly keep his office records and should have a chief clerk who is competent to relieve him of all clerical work. In nearly all yards the clerical force is watched closer than are the noon hours and the engine house. A good yardmaster can save enough every day by getting out and looking after his engines to pay the salary of two or three clerks.

A number of systems are being used in large terminals, not one of which perhaps could be applied to all yards on account of the difference in operating conditions. A system in office work must be instituted so that the general yardmaster can keep an accurate check on his yard work from the office. The yardmaster should know at all times how much work has been done, how much there is to do and when it will be done.

A few years ago I was connected with one of the largest terminal yards on the Pacific coast and one of the first things I had to work out was a system of office records that would be so complete and kept so nearly up to the minute that at any time, day or night, my switching clerk would be able to answer almost any question on the handling of any industrial car in the yard. To do this we made a regular switch order for all industrial cars immediately on arrival and for cars as soon as they were released

from the hold track. These orders were numbered consecutively with a Bates numbering machine and for ready reference the car number and the switch order number were entered up in a terminal number book, so that after the orders were completed they could be located quickly after being filed away. We had the switching territory divided into districts, each engine foreman having a certain district to serve and he was held responsible for the switching in his territory, as well as for any delay that might occur to loads or empties in and out of any industry tracks located on his territory. This engine foreman kept a record, on a switch list of the car numbers, where placed or taken out, which list was turned into the office at noon and night for the information of the switching clerk and to enable him to complete his record on the switch orders which were always kept in the office.

Every morning the engine foreman of each district was handed a switch list made up by the switching clerk showing all the cars in the yard for his territory, with the date of their arrival, together with the track location, so that he would know just where to find his cars and also so that he could, unless otherwise ordered, place the oldest cars first. I had a track assigned in the yard for the reception of industry cars for each district, and as the trains were broken up the cars were put on the different tracks which were reserved for industry cars.

In addition to the switching clerk, I had a clerk, whom I called the industry clerk, who was, in fact, a trainmaster over this switching territory. It was this man's duty to watch the industry switching, riding over the different districts watching for delayed cars, and calling on the patrons to see that work was being handled to their satisfaction. As the engines left the yard in the morning and at noon, this man would take a check of all the cars each engine handled out, sending this check to the switch clerk at the general yard office for his information, so that he would be in a position to say just what cars would be spotted that morning or afternoon. I found out that if one is in a position to tell a shipper when he will get his cars, and if he makes him any particular promise on the delivery of a car, and keeps that promise he is making a friend for the railroad.

There are several different tagging systems in effect in large terminals. I believe the best system is a tag made of different colors, or a combination of colors, each color representing a switching district. This tag can be seen for some distance and helps to expedite switching. Another important thing is for industry engines to leave the yard on time, so that the patrons along each man's route will know what time to expect to have his switching done.

One of the bad features, in all large yards, is the holding of cars for disposition. One of the best ways to eliminate delays to "hold" cars is to have a track set apart for these cars only, and this track should be switched on schedule. In one yard we switched this track at 5 a. m., 11 a. m., and 5 p. m. This assured that the "hold" cars which had been released would get into the industry drag, morning, noon and night. The handling of special request cars, that is, cars that have been delayed en route, or which for some special reason the shipper wants rushed to his track, is a problem in every yard. In order to keep down the yard expense the general yardmaster does not like to cut off an engine, and make a special run with some car to an industry, on which patrons of the line are given regular switches about the same time every day and where all cars which are in the yard at the time the industry engine leaves are delivered to them. Whenever I had a shipper who was continually asking for special switching I sent the industry clerk over to explain how it disorganized our good service to make this special run, and also to tell him about the good service he was getting. I found that as an operating man this clerk could do more good with the patrons of the line than our traffic department could.

I have also found that much benefit can be derived from a weekly staff meeting in the general yardmaster's office, which should be attended by the assistant yardmasters. It pays when possible to have the industry engine foreman attend this meeting, where yard operating problems are talked over, and schemes and systems worked out for better and cheaper operation.

Eight-Wheel Steel Caboose for the Pennsylvania

Another Step Taken by This Road Toward Providing Equipment of Steel Construction; Design Not Standard

The Pennsylvania Railroad has recently designed and built at Altoona an all-steel cabin car or caboose designated as class N-5. This car has not been made standard, but is a tentative design and will be thoroughly tried out on different parts of the road before a decision is made as to its suitability. The severe conditions to which the car will be subjected made it necessary that the construction be as strong as that of heavy steel freight cars, and very careful consideration has been given to each feature of the design, including those which tend to add to the comfort and convenience of the trainmen.

So far as can be learned, this is the first all-steel caboose ever built, the inside lining, the flooring through the passageway, the platform floor and the window sash being the only parts for which wood is used. The car weighs 38,000 lb., and is 31 ft. long from

diaphragms $\frac{3}{8}$ in. thick are located 3 ft. 7 $\frac{13}{16}$ in. on either side of the center line of the cupola, which is 12 $\frac{1}{2}$ in. off the center line of the car, and are riveted to the center and side sills. The usual body bolster has been eliminated and the body side bearings are supported by steel cantilever castings, which are riveted to the center sills and to a $\frac{1}{2}$ in. tie plate, which extends across the bottom of the center sills and outward to the ends of the side bearing castings.

The side sill, or side floor supporting member, is a 4 in. by 4 in. by $\frac{3}{4}$ in. angle, with the back turned outward. This angle is continuous between the side and end sill connecting castings, which form the side supports of the platforms and connect the side sills, the diagonal braces and the end sills, and are shaped at the outer ends to form corner push-pole pockets. The diagonal



First All-Steel Caboose Built for Service on the Pennsylvania

face to face of drawheads, 14 ft. 9 $\frac{1}{2}$ in. high over the cupola lamp, and 10 ft. 2 $\frac{1}{2}$ in. wide over handholds. There is a 30 in. platform on each end, with a 1 $\frac{3}{4}$ in. floor and side box steps. Ratchet hand brakes are used.

UNDERFRAME

The center sill construction of the underframe is similar to that used on the Pennsylvania's steel freight cars, being composed of two 10 in. 25-lb. channels, a 21 in. by $\frac{1}{2}$ in. cover plate riveted the full length of the center sills, and a 4 in. by 4 in. by $\frac{3}{4}$ in. angle riveted to the bottom of each channel on the inside, and extending continuously between back draft lugs, the total area being 36 sq. in. This construction is reinforced by a striking plate at each end, a center plate reinforcing casting above the center plate, and pressed steel spreaders between the diaphragms. The front and back draft lugs are cast integral with the striking plate and the center plate reinforcing castings. Two dished

braces are of U-shaped section, 6 in. wide and $\frac{3}{8}$ in. thick, with 3 in. flanges turned downward. They are flattened out at either end and riveted to the top flange of the center sills and the side and end sill connection.

The end sill is also a pressed U-shaped section, which is fastened to the striking plate and the side and end sill connecting casting. The entire underframe, with the exception of the platform, is covered with $\frac{1}{4}$ in. steel plate, which extends from the center sill cover plate to the side sill angle. The brake rigging supports and the equipment box, which is 4 ft. long, 23 in. deep, and 21 $\frac{7}{8}$ in. high, are secured to this floor sheet. The equipment box is made of $\frac{1}{2}$ in. sheets, with a door at the front which swings down.

SUPERSTRUCTURE

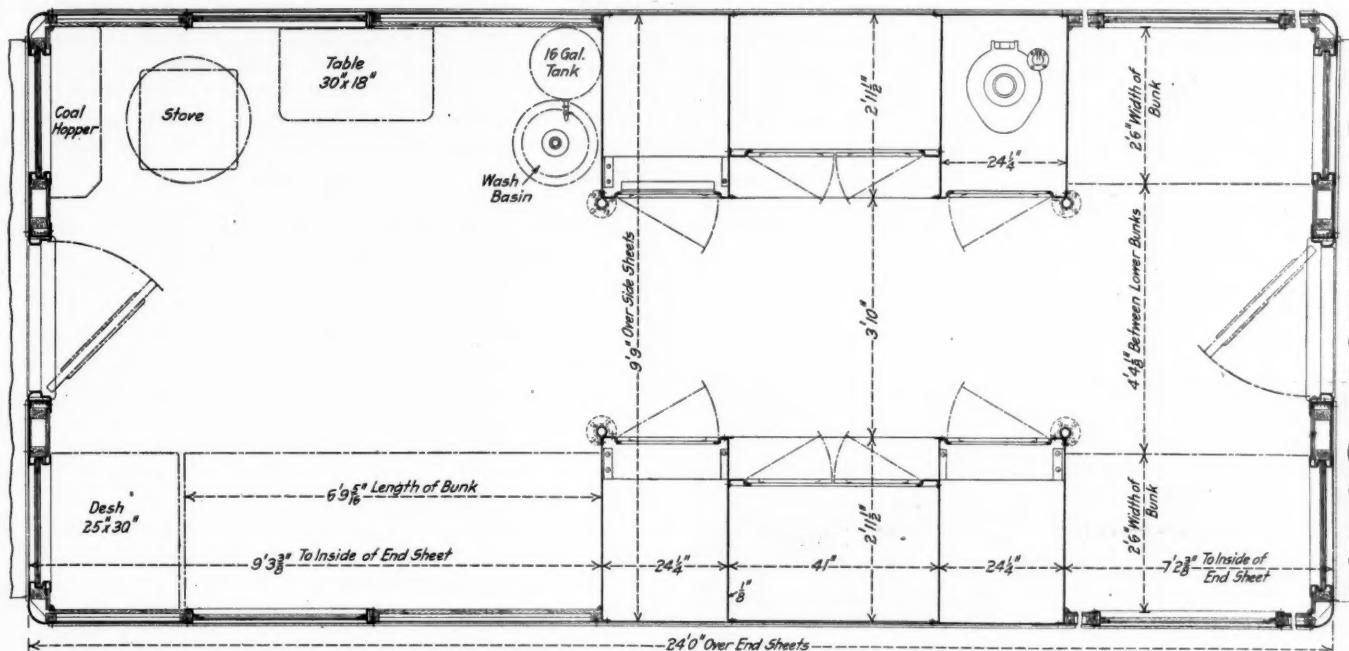
There are no posts used in the superstructure, the transverse stiffness being obtained through the end construction and bulkheads, which form the sides of the lockers at the center of the

The side window frames, which are riveted to the outside of the side sheets, are $\frac{3}{16}$ in. thick. A $\frac{1}{2}$ in. by $\frac{3}{16}$ in. filler extends along the top of the side sheets, between the window frames, so that it is possible to extend them up under the roof sheets, making the construction waterproof and at the same time forming a straight surface to which the roof sheets can be attached.

outside is to leave the interior smooth. The sides of the cupola are inclined towards the center line of the car to allow for tunnel clearance.

ROOF

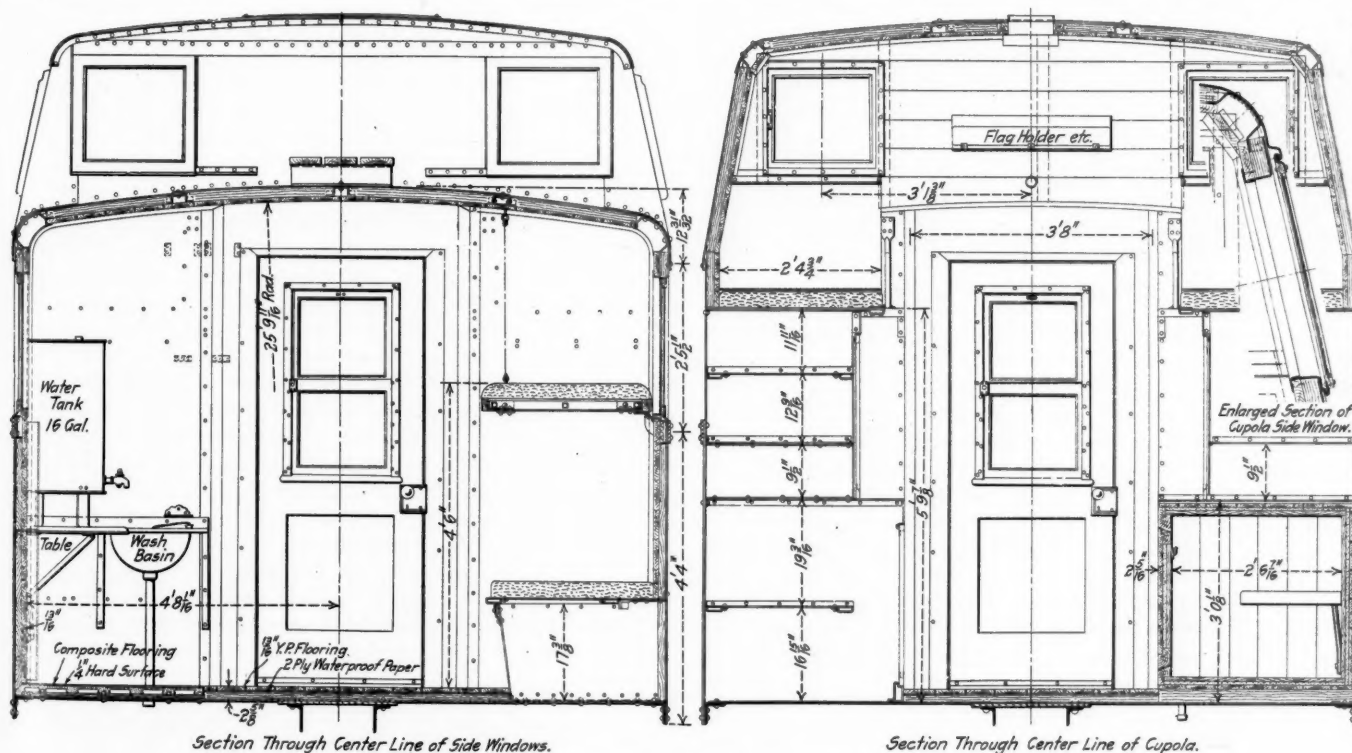
The roof sheets, which are $\frac{3}{32}$ in. thick, extend lengthwise of the car in three panels, two of which, forming side panels, ex-



Floor Plan Showing the Location of the Different Interior Fittings

The cupola extends 2 ft. 6 in. above the body of the car and is of the same general type of construction. The side and end windows of the cupola are all hung on the outside, a top guide

tend down over the sides of the car and fasten to the side sheets and eaves; a central panel, which overlaps the two side panels, is secured with $\frac{1}{4}$ in. rivets spaced $1\frac{1}{2}$ in. apart. Tar paper is



Cross Sections Through the Pennsylvania Caboose

rail being incorporated with the eaves, while the window sill forms the bottom guide. This construction is such that when the window is pushed up against the end projection strip it forms a weathertight construction. The object in placing the windows

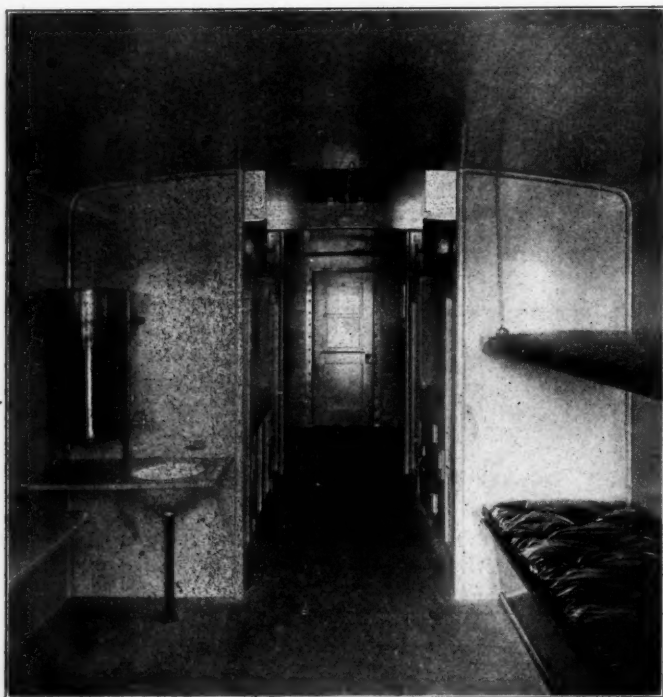
placed between the lap of the center and side sheets, to insure a watertight joint. The main roof is supported by U-shaped purlins, which extend from the end sheets of the car to the cupola end sheets. The cupola roof is of the same construction.

These purlins answer the double purpose of supporting the roof and providing a means of securing nailing strips for the ceiling.

The main roof extends over the platform 2 ft. 2½ in., and has a 2 in. by 2 in. by ¼ in. angle extending around the edge, which lends stiffness to the structure and also acts as a weather strip for leading the water away from above the platform.

INTERIOR ARRANGEMENT

Convenience, comfort and safety were given great consideration in fitting up the inside. The car is equipped with a stove for heating and cooking purposes, a drop table, water cooler, washstand, refrigerator, desk and hopper, as well as lockers, drawers and cupboards for the men's personal belongings. Three pairs of bunks, upper and lower, are located along the sides, one at the stove end and two at the opposite end. The lower bunks are of a box type, 6 ft. 10 in. long and 2 ft. 5 in. wide, and are arranged for the storing of equipment necessary to the car in the bottom. The upper bunks, which are of the same dimensions, are attached to the belt rail by means of a cast steel hinge bracket, and when not required may be lowered and used as a back for the lower



Interior of the Pennsylvania Caboose

bunk when used as a seat. The upper bunks, when raised, are held in position by chains secured to the roof purlins, and hooked to the side of the bunk frame, which is composed of 1¾ in. by 1¾ in. by ¼ in. angles, to which wooden nailing strips are secured for tacking down the canvas top. Including cupola seats, the car has sleeping facilities for eight men, the cupola seats being the same width and length as the bunks.

The lockers, which are located between the bulkheads and the lower cupola seats, contain the refrigerator in the lower center section, on the side opposite the stove and the hopper in one of the end lockers on the other side. The arrangement is such that there is ample room for dishes, food, lamps, oil and waste. All locker doors, drawers, shelves, etc., are 1/16 in. thick.

The side and end windows are above the belt rail, so that the light is not cut off when the upper bunk is raised. The side windows are fixed, while those at the end, including the end door windows, may be dropped. All locks or catches, with the exception of the refrigerator door lock, are flush, thus eliminating projections against which a man might be thrown by a sudden lurch of the car. The cupola is also equipped with a safety rail, extending between the end sheets of the cupola on the center line of the car, which is of convenience as a handhold when descending from the cupola seat.

TRUCKS

The car is equipped with specially designed arch bar trucks of 5 ft. wheelbase, having axles with 3¾ in. by 7 in. journals. The usual column castings are replaced by a malleable casting which serves as a column casting, brake hanger support, spring seat, and spring plank extension. The bolster is of the inverted U-shaped type, with malleable iron stiffening castings, spring seats and bolster guides. The springs are full elliptical, 34 in. long, and there are three in each group. The spring plank is U-shaped, ¾ in. thick and 8 in. wide, with 1½ in. vertical legs turned upward. It extends across the truck 4½ in. beyond the center line of the arch bars, and is flattened at either end and bolted to the bolster guide spring seat and brake hanger support.

EFFECT OF THE WAR ON PRICES OF AMERICAN RAILROAD BONDS*

BY LEWIS B. FRANKLIN

Vice-President of Guaranty Trust Company of New York

The normal factors governing the prices of securities are to a large extent rendered ineffective by the present war and the consequent international financial situation, and any discussion of the trend of prices of American railroad securities involves a consideration of the economic effects of the conflict. In the effort to determine what this effect will be, it is natural to refer back to other occurrences of similar nature and endeavor to forecast from them something of the future.

Upon careful analysis we find that no war in history is comparable in its effect upon financial transactions with the present upheaval.

The Balkan wars involved no nation of importance in commerce or finance, and the theatre of war was strictly localized. Neither Russia nor Japan was a large factor in international business and their operations were confined to the far east. The war between Russia and Turkey in 1876-7 was of similar nature. The Boer war was carried on entirely in South Africa and had no large immediate effect on international business relations, while our conflict with Spain scarcely caused a ripple in the waters of finance. During all these conflicts, communication between the great capitals of the world remained open and international trade was not disturbed. It must not be understood, however, that these wars did not have their effect on the finances of every civilized country. Such a destruction of capital as was involved in even the least of these conflicts has a deep underlying effect on the finances of the world that may take years to overcome, even though no immediate change is apparent.

Not since 1870 have two nations which might be ranked as among the leaders in commerce and finance been engaged in war, and for this reason it is natural to review the effect of the Franco-Prussian war upon international finance in general and American finance in particular.

War was declared by France on July 15, 1870. Prior to and after the declaration there was a rapid fall in prices of securities on the London stock exchange, such American stocks as were listed there sharing in the decline, while in our market there was no great excitement and only a moderate fall. This was followed here by a considerable rise during the progress of hostilities and immediately thereafter. During this period our money market remained undisturbed, except for a seasonal stringency at the end of the year, due to internal causes, while foreign exchange with the leading capitals of Europe continued normal, except with Paris during the siege of that city. The amount of our securities sold to us by Europe was inconsiderable and it was not necessary to resort to any extreme expedients, such as the closing of the stock exchange. It may seem strange that any such upheaval involving, as it did, some 1,700,000 men engaged in

*Address before the Society of Railway Financial Officers, September 16, 1914.

warfare and costing over \$2,500,000,000, should have such a limited effect on our markets, in comparison with the effect of the present struggle, and yet the reason is not hard to find. During the calendar year 1869 our total imports were valued at \$463,424,421, and our exports at \$394,731,999, a total foreign commerce of \$858,156,420, while for the year 1913 our imports were \$1,892,168,000 and our exports \$2,638,593,000, making a total of \$4,530,761,000, or an increase of about 500 per cent over 1869. The interchange of credits involved in transactions of such magnitude is enormous, and this interchange has through the disturbance of financial systems been seriously deranged in some cases and entirely stopped in others. With Germany alone our foreign commerce in 1913 amounted to the stupendous total of \$520,647,283, which is now at an absolute standstill, while our commercial relations with other countries are heavily restricted.

In 1870 our country was just emerging from the chaos of the civil war, our currency was depreciated to the extent of over 10 per cent, and we had practically no stock of gold in our banks. On June 9, 1870, our national banks reported liabilities subject to reserve of \$406,140,873, against which there was held in the reserve, specie to the extent of only \$2,912,275, or less than 1 per cent. On June 30, 1914, our national banks reported gold or gold certificates in their reserve of \$626,000,000.

These facts demonstrate that whereas in 1870 we were financially weak and unimportant, we are now among the leaders in international finance. In the middle ages, the merchant trader sent out his ships with gold in their strong boxes or domestic products in their holds, and they returned from their voyages laden with the products of foreign countries. From this primitive method of barter commerce has progressed until the present complex system of international credits has been established, a system far more intricate than that in existence even in 1870, and it is evident that no consideration of the effects of that conflict can be of value at the present time. We have, therefore, in the past no safe guide to point the way to the solution of the problems which have arisen and will arise on account of the crisis. A study of the probable effects of the war leads naturally to a division of these into two classes, namely: those of a temporary or artificial nature and those of a permanent or basic nature.

We have already experienced most of the immediate results. We have seen the system of international credit relations disrupted at the first blow. Moratoria have been generally declared throughout Europe, and payments due us are held up, while we, as a neutral country, are expected to meet our obligations at maturity. American securities held abroad have been dumped into our markets in such volume that self preservation compelled us to call a halt by the closing of our principal stock exchange and the cessation, by agreement, of the sale of all unlisted securities. Our enormous exports of gold and the consequent strain of our banking facilities have forced us to resort to the expedients of clearing house certificates and emergency currency.

Our foreign commerce, except in foodstuffs, is almost at a standstill. The bureau of agriculture in its recent report gives promise of one of the largest cotton crops in the history of the country. Normally we export approximately 60 per cent of this crop, and at the present time, through the shutting down of foreign mills on account of scarcity of labor, lack of demand for the finished product or inability to finance, hardly a bale of export cotton is moving, and extreme measures are being taken to care for the surplus which is sure to exist.

Despite the fact that the stringent measures already adopted have prevented panic and to some extent opened the channels of trade, we have still to face the problem of meeting the wave of foreign liquidation which is likely to break upon us upon the reopening of our markets. It has been estimated

that American securities to the extent of from four to seven billion dollars are held in Europe, and while it is evident that a large part of these are not for sale at any price, it is quite certain that the drain on the resources of the belligerent nations will be so tremendous as to necessitate enormous liquidation. Their own securities are due to suffer more than ours and our markets are therefore likely to be the most available. This problem must wait until our international credit and commercial relations have been placed on a more normal footing. We cannot buy securities unless we can sell commodities.

If we are unable to take care of our securities now offered for sale by Europe how can we expect to find a market for the additional securities which corporations are so anxious to sell to provide for maturing obligations and necessary improvements and extensions? The prospect is indeed not a favorable one. There is no market for bonds now, and it is hard to say when there will be one and what prices bonds will command when the market opens. In any event, our railroads on the average have now an overproportion of bonded debt compared with the investment represented by capital stock, and it should be by additional issues of stock that present necessities should be financed. How this can be done under present business conditions and the public prejudice against railroad securities is a difficult problem.

Against such an array of unfavorable factors as the immediate result of war, what have we that may be of benefit? In a few lines of business increased activity is indeed noted on the expectation of increased exports of goods to neutral countries heretofore supplied by belligerents, but here again we are confronted with the difficulty of financing any such shipments and the lack of neutral ships to act as carriers. In one respect only is there an immediate benefit and that is in the larger demand at increasing prices for our food supplies, and despite the difficulty of transportation and payment, such shipments are being made in quantity.

It is probable that this abnormal demand for foodstuffs will continue long after the war has ceased. The farmer of Europe has been turned into a soldier, and while his place has been taken to some extent by the women and children, it is evident that the output of the agricultural districts will be greatly reduced both this year and next.

In this emergency, our executives, legislators and business men have been co-operating with a single purpose, to solve some of the intricate problems now presented, and I am hopeful that this close relationship may lead to a better understanding on the part of each and be productive of a more liberal attitude on the part of the government toward our great railroad and industrial corporations.

Having discussed in a very general way the immediate effects of the conflict, let us delve deeper into the situation and see if we can determine the basic factors and the permanent results upon our economic condition.

The first and foremost factor of an unfavorable nature is the enormous destruction of fixed capital which is occurring, and the consequent expectation of higher rates for its use, as there will be an enormous demand to make good the ravages of war. Just let us consider for a moment the difference between fixed and liquid capital. To reduce this to the simplest distinction, fixed capital is wealth represented by permanent plant, such as factories, rails, cars, steamers, etc., while liquid capital is wealth represented by cash, bank balances, loans and other readily convertible items.

Much has already been written on the cost of the present war and its effects on money rates and the supply of capital, but the mistake has frequently been made of confounding currency with capital and expenditures with waste. From an economic standpoint, the waste of capital incident to war is not the total *expense* of the nations involved, but is made up chiefly of the destruction of *productive* property, such as merchant ships, factories, houses and harvests and the tem-

porary loss in the productive capacity of the nations engaged through the enlistment of such a large proportion of their producing population and the permanent loss in productive capacity by death and mutilation.

In a recent article Roger W. Babson points out that the destruction of battleships and fortifications is not in *itself* a destruction of capital, as such property is not productive.

The destruction of capital in this case took place when the fortifications and battleships were built. It is usual to allude to the tremendous loss which will take place if a super-dreadnought, costing upwards of \$10,000,000, is destroyed. The loss has taken place, but not then. The date of the loss from an economic standpoint was the date on which her builders turned her over a completed engine of destruction. She has never produced or helped to produce a single dollar of wealth, she has been a constant drain on the resources of her owner to keep her running and her destruction is a gain rather than a loss to mankind in general. Another loss will occur when she is replaced, but to this I will refer later.

Neither is the feeding and clothing of an army a waste of capital, as these men must be fed and clothed even in times of peace. The enormous loss in capital which is taking place comes from neglected harvest fields, idle factories, deserted mines and wasted towns and villages, and in the killing and maiming of hundreds of thousands of citizens who have heretofore been producers, and many of whom through wounds and illness are destined to become charges upon the commonwealth. In the aggregate this actual consumption of capital is enormous, but we must not be deceived by some of the figures now being published. Professor Charles Richet, of the university of Paris, in discussing the possibility of a war such as is being carried on today, estimated that it would cost \$50,000,000 a day, but of this amount, \$25,050,000 is made up of the items of food, pay to soldiers and workmen and the support of helpless poor, none of which can be considered as capital destruction. The item of transportation, amounting to \$6,300,000 per day, should probably be divided as being a partial economic waste, while he estimates an actual expenditure for munitions of war of \$11,000,000 per day, which is an actual waste of capital, in so far as such munitions are being replaced. In all, his estimate shows a capital loss of over \$20,000,000 per day. No attempt, however, to make an *exact* estimate of either the expenses of the conflict or the amount of the economic waste is of any great value to us, but we may rest assured that the whole world is sure to feel the effects for a long while to come. Capital which for the past few years has been difficult to obtain will be in still greater demand to make good the losses of war, and it is reasonable to look forward to a long period of higher interest rates on fixed investments, a small supply of new capital and lower prices for investment securities unless we can discover off-setting factors of a sufficiently favorable nature.

Let us look then and see what we have on the other side of the picture. Possibly there may be a ray of sunshine somewhere.

One of the first results of a condition of affairs such as we are now experiencing is increasing economy on the part of practically every class of society.

I believe that the generally prosperous condition of this country during the last twenty years has led to a gradual reduction in the *proportionate* amount of savings which has in the last few years contributed to our higher cost of living and our higher cost of capital. It is generally conceded that the maximum of saving does not take place in periods of great prosperity and an upheaval such as the present crisis is often the signal for a return to a simpler scale of living and an increased proportion of saving. It will not take a very large increase of savings per capita to make a radical increase in the amount of capital available yearly. In this connection, it is interesting to note that our people in gen-

eral are far behind those of other countries in the habit of saving. It has recently been stated that the ten leading nations of Europe boast of 373 savings bank depositors per thousand of population, while in the United States the proportion is only 99 to the thousand. Here is room for improvement. The increase or decrease in the wealth of a person or a nation is the difference between income and expenditure.

I have already referred to increased activity in certain lines of business as one of the immediate results of the war, and there are likely to be permanent results of a similar nature. Efforts are already being made looking to the restoration of our merchant marine to its former place of prominence in the commerce of the world, which, if successful, will result in many millions of dollars per annum formerly paid to foreign carriers remaining in this country.

Our imports of drugs, dyes, chemicals, toys, gloves, clothing, etc., from Germany have been stopped and supplies of these articles are diminishing and prices rising. American ingenuity is already at work in an effort to manufacture in this country much that we have heretofore imported. If this effort is crowned with success, our productive capacity will be permanently increased and our trade balance benefited. Markets heretofore held by belligerents, principally Germany, whose foreign trade is now at a standstill, are now open to our manufacturers, and if our opportunities in this respect are not neglected our export business should be permanently benefited. The favorable factors just mentioned redound to our benefit as a neutral nation and although of importance can scarcely offset the effect which the general destruction of capital will have on the civilized world and in which we must suffer with the rest. Is there any result of the conflict which may in any way counteract the evil influences upon the general economic condition? I believe there is, but to discover what it is we must consider carefully the underlying causes which led to the outbreak of the war.

It is generally conceded that the massacre of Archduke Francis Ferdinand of Austria and the consequent ultimatum from Austria to Serbia was the *pretext* for the war and not its *cause*. It has been held by some that Germany's ambition to extend her influence through the Balkans to the Aegean sea, to control the Dutch and Belgian harbors, and to further extend her colonial possessions was at the bottom of the trouble. Russia, of course, has always had a jealous eye on the Balkans, and hope for the ultimate possession of Constantinople, and apparently it was the probable increase of German and Austrian influence in southeastern Europe in case of the overthrow of Serbia that led the Czar into the present struggle. France was bound by treaty obligations to support Russia, and her people saw an opportunity of regaining the beloved territory lost in 1870. England and Belgium stepped in upon the violation of the latter's neutrality. With the prospect of an absolute upsetting of the balance of power, self-preservation demanded that Great Britain take a hand in the struggle.

The *immediate* cause of the general outburst seems to have been the support offered by Germany to Austria in her demands upon Serbia and Russia's protest against this action, but we must look below the surface and see if we can discover a motive for this radical move on the part of the German statesmen.

Germany's appropriation for the year ended April 1, 1913, for the maintenance of her army and navy amounted to the equivalent of \$285,000,000, an increase of approximately \$85,000,000 over 1911. This is equal to about \$7.32 per capita on the entire population. This enormous sum and a still greater amount proposed for the year 1914 could only be met by the imposition of an onerous direct tax. This rapid increase in military appropriations was apparently forced upon Germany by the action of Russia, who increased her military budget from \$335,555,000 in 1911 to \$463,690,000

in 1913. Both Germany and France have also recently increased the term of compulsory military service.

Such a competition in expenditures and in military service could not continue indefinitely. Germany, in addition to the protests against the heavy taxes, was confronted with an evergrowing wave of socialism. The socialist has always been arrayed against war and in favor of peace, and this movement was of sufficient strength to threaten even the established form of monarchical government. Something had to be done to stop or justify the mad competition of military expenditures to quiet the socialistic element, and to re-establish the "divine right of kings." Germany was ready; her enemies not so ready as they would be in a few years. War was the only solution and a pretext was not hard to find. In other words, I believe that Germany's action was inspired by causes internal rather than external.

Granting if you will that this hypothesis is correct, what bearing has it upon the subject of capital and interest rates?

There seems to me to be three possible terminations to the struggle:

1st—Mediation before complete victory by either side.

2nd—Complete victory for Germany and Austria.

3d—Complete victory for the Allies.

In case the war is settled before a decisive victory, it seems to me that while there may be important adjustments in the map of Europe, no radical changes of an economic nature will result. Europe will continue to be an armed camp, and it is not unlikely that the struggle would be renewed some years later. Military equipment, battleships, forts and guns destroyed in the conflict would have to be replaced and military appropriations would continue on an even heavier scale. In this connection, it must be remembered that Europe is even now staggering under a load of national debt approximating, for the five principal nations, only \$20,000,000,000, demanding at 3½ per cent \$700,000,000 per annum for interest alone. The world, already suffering under its present load of debt and useless expenditure, and with the ravages of war to be paid would indeed be in a bad way, while the condition of Europe, from a financial standpoint, would be appalling.

Under such circumstances what can we expect the effect to be upon *our* securities and upon the future financing of *our* great corporations. Europe until recently has been a constant and heavy purchaser of our stocks and bonds and has been of immense assistance in developing the natural resources of the country, but if her burdens are to be increased to the extent that I have outlined, we need look for no more help from that quarter and would indeed be compelled to repurchase many of our securities now held abroad. With such a prospect before us we cannot but anticipate higher interest rates for fixed investments, greater difficulty in selling securities and a consequent period of retrenchment.

In case of a complete victory for Germany and Austria, the result is also easy to forecast. Germany has been created, enlarged and solidified by the "blood and iron" policy enunciated by Bismarck in 1863. Her military organization again justified by victory, is it reasonable to suppose that she would agree to abandon the sword which has brought her into power? And if Germany retains her army and navy in undiminished strength, can others afford to adopt a different policy? We think not.

The third possible outcome presents a different aspect. In case of complete victory for the Allies, it seems evident that England will have a predominant position in the making of terms. She wants little or nothing in the way of territory and desires chiefly the prosperity of her people and the peace of Europe. England only a short time before the war is reported to have made, without result, a suggestion to Germany for a mutual reduction of the naval program. This indicates that England, despite her small standing army, has felt the strain of military expenditures even in times of peace, and the attitude of her diplomats prior to the outbreak clearly demonstrated her desire to prevent the conflict. France, with all her war-

like history, is a peaceful nation at heart, while Belgium desires only reparation for damages and an effective guaranty of neutrality. Servia and Japan cannot be considered as important factors in the making of terms of peace. Every nation involved has felt the enormous strain of military expenditures, and in the event of an ultimate victory for the Allies, is it a wild dream to expect that as the only remedy the practical disarmament of Europe, nay, of the whole world, may be the outcome? Germany beaten, with its military organization unjustified, would hardly be in a position to protest or even to persuade her own people to rebuild the organization, if such a thing were to be allowed under the terms of settlement.

Russia, with its monarchical government, seems to be the key to the problem, yet it must not be forgotten that, whatever his motives, it was from the present Czar, even then disturbed by the growth of military expenditure, that there came in the year 1898 the first tentative proposition for universal disarmament. If this could be accomplished, what would it mean to Europe and to the world?

During the last fiscal year for which figures are available the estimated expenditures of the principal nations of Europe for military purposes amounted to the huge total of \$2,000,000,000. Imagine, if you can, what it would mean if this sum were to be diverted from the support of the destructive forces and used in the development of the natural resources of the world. Such a sum added to the present amount available annually for investment would mean an abundance of capital for industrial development, both here and abroad, lower interest rates and probably lower cost of living. Add to this the transfer of some 4,500,000 men which make up the standing armies of Europe on a peace footing, from a life of economic waste to productive pursuits, and it is not hard to believe that Europe would require very few years to recover from the ravages of war and enter upon a long period of prosperity from which we would be one of the greatest beneficiaries. Under such conditions, capital would accumulate with surprising rapidity, and Europe would soon be a heavy buyer of our securities, and we would witness in the country an era of expansion and prosperity such as we have never before experienced. If disarmament can be accomplished, the outlook is indeed bright, but under no other conditions can I feel that there is anything to look forward to except a long period of retrenchment, lack of capital, high interest rates and general business depression in which Europe will be the principal sufferer, but in which America is bound to share.

The United States, as the greatest neutral nation, with nothing at stake except the progress of humanity is in a position to exert her strongest influence with her friends on the other side of the water that permanent good may result from this awful catastrophe.

Under such circumstances, is it not the patriotic duty of every American, regardless of his present sympathies, to work unceasingly to the end that public opinion both here and abroad may be so united and strengthened in the resolve for complete disarmament that it can be disregarded by neither Congress nor Parliament, Czar nor Emperor?

In making these suggestions as to the possible outcome I do not want to be understood as taking a partisan attitude or violating the injunction of our president as to strict neutrality, in thought, word and deed. It is surely not partisan but Christian to hope that the outcome may be such as to relieve the world of its burden of militarism and usher in an abiding era of peace, prosperity and happiness.

ENGLISH RAILWAY EMPLOYEES TO ASSIST IN RAILWAY OPERATION IN FRANCE.—The British war office has recently called for 1,000 special railway men to proceed to France to assist in the operation of the French railways. Several enginemen, telegraphers, inspectors and officers have volunteered from Crewe. They are all experts in their particular branch of work. It is stated that the officers who go will rank as officers in the army and the inspectors as non-commissioned officers.

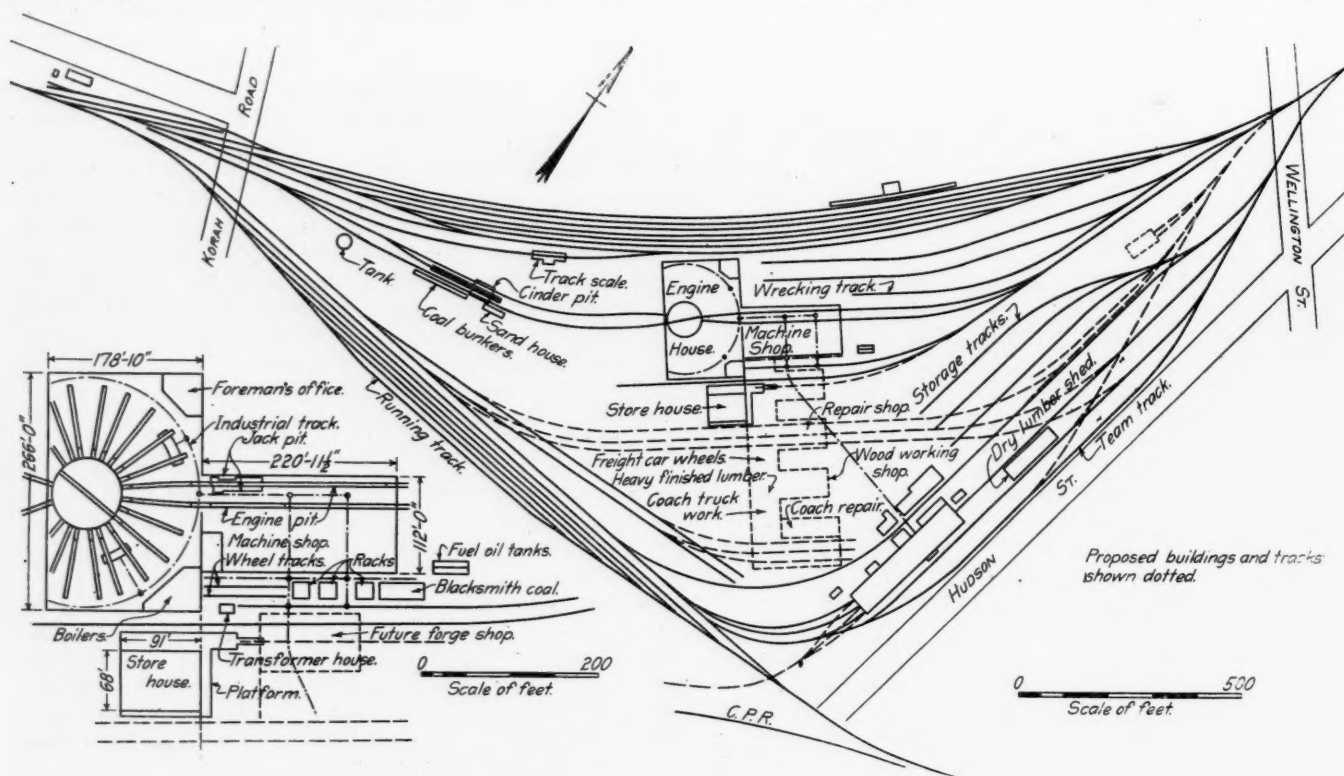
The New Algoma Central Engine House and Shops

Novel Features Designed to Meet Climatic Conditions
Characterize the Terminal at Sault Ste. Marie, Ont.

The Algoma Central Railway recently completed extensive terminal facilities in Sault Ste. Marie, Ont., which include an engine house, shop layout and miscellaneous facilities embodying a number of unusual features of design. The terminal is comparatively small but it was essential in the design of the buildings that unusual precautions be taken to insure its satisfactory operation throughout the winter weather which is severe and is ac-

the consideration of a square house as the most economical form of building, and since the number of doors in such a house could be cut down to two, thus greatly reducing the difficulty of heating the house, and the structural features of the building could be readily standardized with the machine shop, storehouse and proposed car shop, this type was finally adopted.

The house is designed to contain 24 stalls, but as this capacity



General Plan of Algoma Central Terminal at Sault Ste. Marie, Ont., with Detail of Engine House and Shops

companied by almost continuous heavy snow. As the exposed turntable is one of the greatest sources of expense and delay under such climatic conditions, it was determined to enclose the turntable in the engine house. This necessity naturally led to

is not required at present, a portion of the building covering 14 pits has been built, with provision for extending this to the full size when desired. The pits are kept close to the turntable, for with the comparatively few radial tracks only about 12 ft. is re-

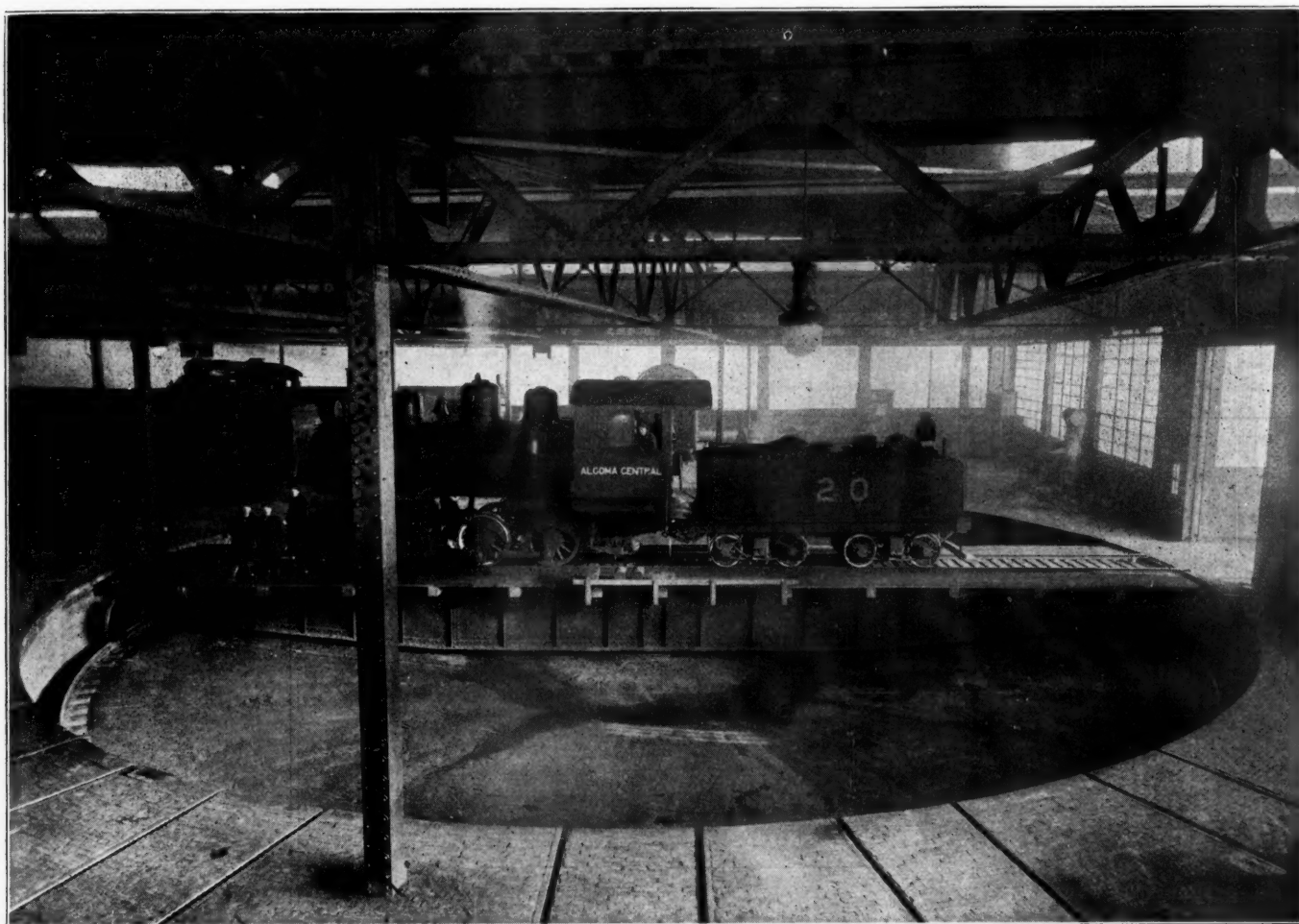


New Rectangular Engine House at Sault Ste. Marie, Ont., Showing Typical Winter Conditions

quired between the end of the 80-ft. table and the 70-ft. pit to secure the necessary clearance. These dimensions would require a house at least 250 ft. square to cover the complete circle, and in order to allow space around the ends of the pits for an industrial track and to enable the roof construction to be arranged in 44 ft. units, which was desirable for the shop buildings, the sides of the engine house were made 266 ft. The present width is 178 ft. 10 in., and the front wall is so constructed that it can be easily removed and the material used in the corresponding wall of the complete house when it is desirable to make the addition of 88 ft. and provide the remaining 10 pits of the complete circle. The triangular spaces in the corners of the building are utilized for a foreman's office and locker room, and the boiler equipment for heating the buildings.

The foundations are of concrete, which is carried up to a height

is operated by a pneumatic tractor. The center pier is of concrete, liberal in size, being 11 ft. 6 in. square at the base. The concrete pit floor is 5 in. thick pitched to drain to a circular gutter 14 ft. from the center of the pit, which carries the drainage to a large sump connected with the sewer. The pits under the engine stalls are 70 ft. long and 3 ft. 11 in. wide, varying in depth from 2 ft. 8 in. to 3 ft. 2 in. The 80-lb. pit rails are spiked to 6 in. by 8 in. by 1 ft. 4 in. creosoted cross ties, anchored in the concrete walls of the pit. The floor consists of paving brick laid on a 6-in. concrete base. A driving wheel drop pit is provided under two tracks and a truck wheel drop pit under two other tracks. These drop pits have a 24-in. gage track from end to end for transferring wheels, which, when lifted to the floor level, can be run out on a narrow gage track connected to the circular industrial track at the ends of the stalls.



Interior View of Rectangular Engine House

of 5 ft. 6 in. above grade, for the outside walls, above which brick is used, with 3-ft. pilasters spaced 22 ft. center to center. The long spans, the advantage of fireproof construction, and the ability to use the same details as in the other buildings of the group led to the adoption of steel roof trusses supported on the brick walls and on latticed steel channel box columns. Monitors 22 ft. wide are provided over each bay running parallel with the direction of the prevailing wind in order to reduce the accumulation of snow on the roof. The monitors are all equipped with Pond continuous steel sash hinged at the top for ventilation. The roof trusses carry steel purlins on which is laid 2-in. wood sheathing covered by a 5-ply Barrett specification roofing, finished at the edges with a graveled copper guard. The steel roof trusses are protected from corrosion by a special preservative paint known as "Ferro-Rubron," an English product, and the additional precaution of allowing ample metal in all trusses was taken.

The turntable is 80 ft. long, has a capacity of 200 tons, and

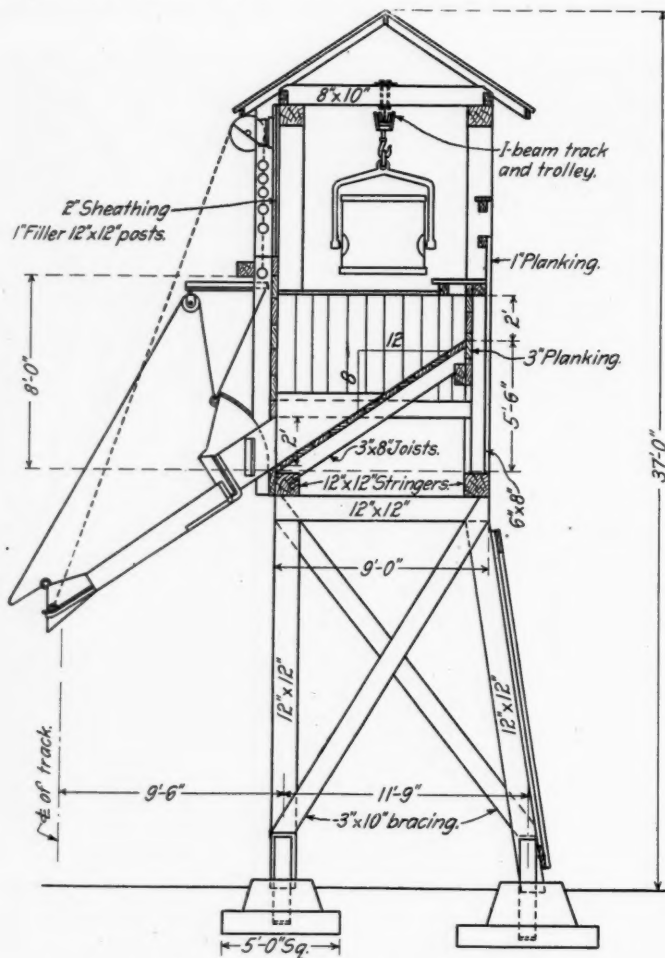
The smokejacks are of sectional cast iron construction, furnished by the Paul Dickinson Co., Ltd.

The building is heated by the indirect system, consisting of a steam driven fan and Green "Positivflow" horizontal heater coils. The hot air is forced through underground concrete tunnels and vitrified tile ducts to the turntable pit and all engine pits. The heating provisions are somewhat in excess of standard practice. Steam is supplied by three internally fired boilers of 150 h. p. each. The building is lighted with large capacity Tungsten units and flaming arc lamps. Electric power for the shops is purchased from a local hydro-electric company.

The machine shop is 112 ft. wide and 221 ft. long, connecting directly with the engine house. Two tracks extend through both buildings passing over engine pits in the machine shop, served by a 10-ton electric crane and an electrically operated locomotive screw jack. A space 54 ft. wide extending practically the full length of the shop is devoted to the machine tools and black-

smith shop, the foreman's office, tool room and toilet room occupies one end of this space.

The foundations and walls of the machine shop are of the same type as in the engine house. The building is divided into two bays, one 44 ft. wide and one 66 ft. wide. The former is covered by a single pitch steel truss roof supported by steel columns at each end, with a clearance above the floor of 18 ft. 2 in. The 66-ft. bay is covered by double steel trusses with steel monitor framing extending the full length of the building. Steel sash and Pond operating devices are used throughout. The roof consists of reinforced cement tiles $1\frac{3}{4}$ in. thick, cast in slabs about 5 ft. 6 in. long and 2 ft. wide. These slabs bear directly on the steel purlins and on the walls, and are covered with 5-ply Barrett specification roofing finished in the same



Typical Cross Section Through the Coaling Station

manner as on the engine house. The floor of the building consists of 5 in. of concrete covered with a 1-in. sand cushion on which are laid 3-in. creosoted maple paving blocks. The building is heated in the same manner as the engine house, except that the hot air is partially distributed through overhead galvanized sheet metal ducts.

The storehouse, which is 68 ft. by 91 ft. in size, is located with reference to a proposed development of freight and passenger car repair shops arranged along a covered runway for a traveling crane and the storage of material so that in severe weather all work can be handled between the various portions of the shop under cover. The central connecting passage with shops extending at right angles to it allows any desired expansion to be made in the size of the individual shops without affecting the general plan as long as a longitudinal shop is not objectionable.

The coaling station is of an unusual type, similar in general details to a number of stations that have been developed for use in the northern portions of the country where the operating conditions are very severe during the winter. The building is

entirely of timber well over-sized to allow for deterioration, and all posts rest on concrete footings with heavy steel plate anchor straps. The supply of coal for the winter months must be purchased during the summer when it can be delivered in lake boats, and it is stored on the ground adjacent to the coaling station. Only a limited storage is provided in the 13 inclined bottom coal pockets in the house, the supply being conveyed from the storage pile to the dock in quantities to meet the daily demand. The coal is loaded into one-ton steel buckets with bales which are moved to the ends of the coal dock. The buckets are then hoisted to a trolley track extending longitudinally over the elevated delivery bins by a plain inverted pneumatic hoist operating in conjunction with a jib crane to allow the buckets to be swung around and the bale hooked on a plain I-beam trolley on the runway track. The hoist is then released by the operator, who pushes the loaded bucket along the track directly over the pocket to be filled, and, by releasing an automatic catch on the bale, the bucket empties the coal into the pocket and is then conveyed back to the storage pile for refilling. The delivery pockets are designed to deliver predetermined amounts of coal to locomotive tenders, the capacity ranging from two tons to eight tons. Each pocket is equipped with an Ogle delivery gate and spout which is said to be frost-proof. The entire structure is covered with a wood-sheathed roof and composition roofing.

This work has been carried out under the general direction of R. S. McCormick, chief engineer. The plans were made by The Arnold Company, Chicago, who were also the constructors of the entire plant. P. L. Battey, vice-president of the Arnold company, supervised the work and construction was carried out under the direction of H. H. Dickinson.

RAILWAY AFFAIRS IN OTHER COUNTRIES

Financial conditions in Brazil were not of the best during 1913, and this state of things is reflected in the recently issued report of the Brazil Railway for that year. This company, which was incorporated in 1906, operates directly some 3,280 miles of railway in southern Brazil, and has a large interest in the Paulista and Mogyana Railways, which own 1,795 miles of line in the state of São Paulo. It has a large interest in the Madeira-Mamore Railway and the Uruguay Railway, and in subsidiary enterprises, which are expected eventually to produce a profit in themselves and also to bring new traffic. An all-rail connection between São Paulo and Montevideo was established during the year by the completion of the bridge over the River Uruguay and of the connection with the Central Uruguay at Sant' Anna.

From the lines in southern Brazil directly operated by the company, gross receipts were secured in 1913 of \$14,479,920, representing an increase of \$1,422,228, or 10.89 per cent. Operating expenses (\$9,200,534) were, however, higher by \$1,716,639, or 22.94 per cent, leaving net receipts lower by \$261,074, or 5.28 per cent. Receipts show increases under nearly all headings, because of the stimulus given to low-grade traffic by reductions in tariffs and because of improved train facilities. The higher percentage of operating expenses (63.54 against 57.31) is due partly to the greater mileage of line in operation, 154 additional miles having been opened during the year. There was also a heavier renewal of ties, and an increase in tonnage and train-mileage, consequent on the better service given both for passengers and merchandise, which entailed a heavier coal consumption and a larger wages bill.

In spite of the commercial crisis in Brazil the receipts of the Paulista and Mogyana Railways, in which the Brazil Company is largely interested, showed a steady expansion, and the same dividends of 12 and 10 per cent, respectively, as in the previous year, were declared by each company, and their reserves further augmented. This was done in spite of the increase in working expenses.

The earnings of the Madeira-Mamore Railway, on the other hand, were affected by the severe depression in the Amazon valley following a severe crisis in the rubber industry.

Effect of the Panama Canal on Coast-to-Coast Traffic

Improved Service and Reduced Rates Take Business from Rail Lines. Ask Relief from Fourth Section

Interesting testimony showing the effect of the Panama canal on water rates from the Atlantic to the Pacific coasts was presented at a hearing before Special Examiner Thurtell of the Interstate Commerce Commission in Chicago on October 6, 7, 8, 9 and 10, on the application of the transcontinental railways for relief from the recent fourth section order of the Interstate Commerce Commission, to enable them to make reduced rates to the Pacific coast terminals on 107 commodities sufficiently low to meet water competition without making a reduction in the rates on these commodities to the intermediate points.

The hearing was held pursuant to a petition filed by the carriers with the commission on July 9, following the decision of the Supreme Court, sustaining the commission's order in the Inter-mountain rate case, in which the roads submitted to the commission three schedules of rates. Schedule A is a list of commodities on which the rates to Pacific coast terminals will apply as maxima to intermediate points and on which no relief is requested. Schedule B consists of commodities subject to water competition at the Pacific coast terminals, but on which the rates from the Missouri river to the Pacific coast by rail are generally not less than \$2 for less than carload lots and \$1 for carload lots, and as to which the carriers will observe the fourth section rule of the commission, applying only such percentages over the through rates at the intermediate points as were designated for the respective zones in the original order of the commission, 7 per cent from Mississippi river and Chicago territory, 15 per cent from the Buffalo-Pittsburgh and Cincinnati-Detroit territories, and 25 per cent from New York territory. Tariffs are now being compiled by the carriers of the rates on commodities named in schedules A and B to become effective on November 15. Schedule C is a list of 107 commodities covering generally manufactured articles subject to the most severe water competition, on which the rates to the coast are less than \$1 in carloads and \$2 in less than carloads, which rates the carriers consider subnormal to a marked degree, measured by any recognized standard that has been fixed by the commission as reasonable, but which are necessary to move a share of this water competitive traffic by rail, also to enable manufacturers and shippers at points of production not located directly on the Atlantic seaboard to share in the trade of the Pacific coast. These rates are so low that the carriers consider they should not be used as a basis for rates to interior points. As to these rates the carriers asked permission to present to the commission such evidence as in their opinion would completely justify a greater degree of relief from the provisions of the fourth section than was granted in the order.

THE CONTENTION OF THE RAILWAYS

An opening statement outlining the position of the railways was made by Charles Donnelly, assistant general counsel of the Northern Pacific. Mr. Donnelly said that the order of the commission, which was sustained by the Supreme Court, provided only for a relation of rates, and the carriers might have complied with it literally by advancing all terminal rates to the level of the intermediate rates complained of. In the meantime, the conditions existing at the time when the order was entered had changed radically. The carriers were confronted, therefore, with the necessity of adopting that method of compliance with the order which would best conserve their revenue. Their position is that upon the commodities in schedule C the existing rates to intermediate territory tried by the standards afforded by the decisions of the commission in other cases involving rates into the intermountain territory are just and reasonable for the service performed, and that the roads ought to be allowed to make rates to the terminals without reference to the existing

intermediate rates. The general justification which has always existed for the maintenance of lower rates to the Pacific coast terminals is that they were necessary primarily to enable rail carriers moving traffic from the Atlantic coast to the Pacific coast to get any of that traffic in competition with other carriers who were moving it to the same destination by cheaper means of transportation. The proposition of the carriers has always been that if this traffic can be given to a boat in New York, and carried to San Francisco for 50 cents they ought to be allowed to charge a rate of 60 cents for the movement of the traffic to that destination, if such a rate would yield something in excess of the out-of-pocket expense, and to charge it without in any way affecting those rates which were at the same time collected to intermediate territory. The carriers maintained that that was true not only of traffic originating in New York, but as well of traffic originating in territory immediately adjacent.

They also contended that if in point of fact railways having their eastern termini in the Middle West could find that same commodity produced or manufactured there, they ought to be permitted to pick it up at that point and deliver it at the Pacific coast upon rates which would enable them to do so in competition with the rates established by the water carriers upon the same traffic originating at the Atlantic seaboard, and that they ought to be permitted to do so without any reference to the rate to the intermediate points. He cited, for example, that at the present time 15,000 lb. of wrought iron pipe was moving from Youngstown, Ohio, to a Pacific coast destination upon the combination rate of 18 cents from Youngstown to New York plus 35 cents from New York to the Pacific coast, or a total of 53 cents, while the existing rail rate is 65 cents. The rate cannot move the business in competition with the rate established by the rail and water route. Can any conceivable reason be assigned, he asked, why, if the carriers can under existing operating conditions move the same traffic from point of origin to the same destination at rates only slightly in excess of this combination they ought to be penalized by the depression of rates otherwise just and reasonable to intermediate territory? No conceivable reason can be assigned, he said, why, as the condition of allowing carriers to compete for such traffic, they should be compelled to forego what they might otherwise lawfully and reasonably ask for the service they render to interior points. The question also involves, he said, the interests of the Middle West. The interests of the interior communities are no more affected if the carriers are allowed to pick up the same traffic in the interior and move it to the Pacific coast on rates which will allow them to compete with water carriers than they would be if the carriers are allowed to compete from the Atlantic seaboard. The question involved, therefore, is: Shall the transcontinental carriers, in view of the conditions existing now as the result of the construction of the Panama Canal, be compelled to go out of the business of moving to the Pacific coast traffic which, if they move it at all, they must move in competition with the water carriers?

NEW CONDITIONS CREATED BY THE CANAL

The first witness for the carriers was P. P. Hastings, assistant general freight agent of the Atchison, Topeka & Santa Fe coast lines, at San Francisco, Cal. Mr. Hastings said that the sea competition within the past few months has been increasing by leaps and bounds, particularly because of the opening of the Panama Canal. The opening of the canal has resulted in much better service by water; the time is shorter and the dates of sailing are more frequent on the lines which were doing business across the isthmus either of Panama or of Tehuantepec, prior to the opening of the canal, and new lines have gone into the business and are still going in, which make the sailings from

the ports on both the east and west very much more frequent than they were before. Moreover, water lines are loading vessels at additional ports, principally gulf ports, and there is no longer the necessity of trans-shipment from sea to rail and from rail to sea again in crossing the isthmus with the intervening rail haul between trans-shipments. Whether entirely because of the opening of the canal or of the new lines entering the service, there has also been a very radical reduction in the rates of the water lines since the opening of the canal, and the roads are daily receiving reliable information about further reductions being made. These things have served very materially to increase the tonnage moving by water lines, not only on schedule C commodities, but also on other commodities. Advice had been received within the last day or two from railroad representatives at both New York and San Francisco and Los Angeles, and on the north coast, of a reduction announced on October 1, on from 300 to 400 commodities, these reductions being either further reductions or reductions on commodities not formerly announced. Even prior to these reductions by the water lines the rail rates did not, in most instances, fully meet the sea competition, but the rail lines were able to obtain a considerable share of the traffic because of their better service. Pending the decision in this case the rail carriers did not feel at liberty to make any changes in their terminal rates to meet the new conditions. Most, if not all, of the rates on the schedule C commodities must be reduced if the railroads are to continue to share in the traffic at the terminal points.

RATES VIA THE CANAL

Mr. Hastings then presented an exhibit showing the water rates prior to the opening of the canal and the rates quoted as of September 5, 1914, and also the movements by sea for the

first put out only on the heavier articles, or those which moved in largest quantity, is now applied to the iron list generally by the water lines in carloads. Wine has been quoted at 30 cents in carloads. Wire fencing, formerly 65 cents, is now quoted at 30 cents. In addition there have been a great many reductions on schedule B commodities. Even before the opening of the canal there was a considerable movement from points west of the Pittsburgh-Buffalo territory, which is very materially increasing, but at the time the shipments moved, the movement by sea was largely from those territories. There is also a great amount of traffic by water of practically all commodities from New York City. There are also shipments from Boston, Charleston, S. C., and Gulfport, Miss.

Mr. Hastings introduced a statement showing the tonnage of freight handled westbound by water lines from the Atlantic seaboard to Pacific coast ports, for the years 1907-13, inclusive, compared with that moving through the Panama Canal in September, 1914, the first full month since the canal has been open for business. The total tonnage to American Pacific coast ports, excluding that via the Straits of Magellan and Cape Horn, which was not available, has been as follows: 1907, 139,448; 1908, 141,484; 1909, 254,387; 1910, 290,122; 1911, 397,974; 1912, 451,582; 1913, 434,115. For the month of September 1914, the Emery Steamship Company carried 8,400 tons; the Panama Railroad Steamship Company, 444 tons; the Atlantic & Pacific Steamship Company, 13,482; the American-Hawaiian Steamship Company, 43,312; the Luckenbach Steamship Company, 12,277, making a total of 77,915 tons. This, multiplied by 12, equals 934,980 tons, which would be over twice the tonnage moving by water in any previous year. The figures for September do not include any business via two of the new lines from the South Atlantic and Gulf ports. Mr. Hastings explained that as the canal was

SUMMARY OF SERVICE VIA WATER LINES BETWEEN ATLANTIC AND GULF PORTS AND PACIFIC COAST PORTS SINCE OPENING OF PANAMA CANAL

Steamship line	Number of vessels	Total tonnage capacity	Ports from	Ports to	Frequency of sailings	Time in transit to San Francisco	Remarks
American Hawaiian S.S. Co.	26	260,000	New York	San Diego Los Angeles Harbor San Francisco Portland Seattle Tacoma	5 days	23 days	Have declared intention to make Gulf ports, eastbound, and Charleston, S. C., westbound, soon.
Luckenbach S.S. Co.....	8	40,500	New York *Philadelphia	Los Angeles Harbor San Francisco (Cargo for North Pacific Coast ports transhipped at San Francisco)	10 days	27 days	Will make Gulf ports early in October, both directions.
W. R. Grace & Co..... (Atlantic & Pacific S.S. Co.)	4	30,000 to 40,000	New York	Los Angeles Harbor San Francisco Puget Sound	15 days to 20 days	20 days	.....
Emery S.S. Co..... (Boston & Atlantic S.S. Co.)	2	17,000	Boston	Los Angeles Harbor San Francisco	35 days to 40 days	27 days	.....
Swayne & Hoyt.....	3	15,000	New York	Los Angeles Harbor San Francisco	30 days	23 days	.....
Sudden & Christianson.....	6	27,000	New York	Los Angeles Harbor San Francisco	15 days	24 days	Announce will make Gulf ports, including Mobile, New Orleans and Galveston.

*Effective October 8.

year 1913, on the items covered by schedule C. These rates were quoted by the American-Hawaiian Steamship Company. Since September 5 many other reductions have been announced. For example, the carload rate on calcium chloride, which before the opening of the canal was 45 cents per 100 lb., has been reduced to 35 cents in carloads; on canned goods from 55 and 60 cents to 45 cents; coffee, 55 to 45; telegraph line material, 55 to 35; window glass, 75 to 60; ink 90 to 75; a large number of iron and steel articles, from rates ranging from 45 to 60 cents to 30 cents; nails, from 50 cents to 30 cents; oils from 60 to 50; paints, 65 to 50; white lead, 55 to 50; paper and articles of paper, 75 to 60; roofing materials 75 to 65; tin 55 to 50; wire and wire goods, 55 to 30; rail fastenings, from 50 to 30. The general item of hardware, formerly quoted at \$1, both l. c. l. and carloads, is now quoted at 80 to 85 cents. Pipe fittings and connections have recently been reduced from 40 to 30 cents; cast iron pipes from 40 to 35 cents. On iron and steel articles the 30-cent quotation,

opened on August 15, and was in complete operation during the last half of August, any freight that was held back awaiting the opening might reasonably be supposed to have got through before September, so that the figures for September should indicate a normal month, except for the fact that rates are going down and new lines and new ports are entering into the traffic, so that it may be reasonable to expect an increase, unless there should be a change in the rate situation.

SERVICE VIA THE CANAL

Another exhibit showed the lines which are now engaged regularly, or will be within the coming month, in the traffic through the canal, and some information regarding the proposed service. This exhibit is shown in the accompanying table. From this table Mr. Hastings estimated a monthly capacity of 111,600 tons. Moreover, he had just received an announcement of the inauguration of a fleet by the Panama-Pacific Line, to begin

operations between San Francisco and New York in May, 1915, with two boats of 4,000 tons each.

PROPOSED RATES

Another exhibit showed the tonnage of schedule C commodities moving by rail from the east to Pacific coast terminals during the year 1913, with a column showing the movement of the same commodities by sea. Another showed the commodities covered by schedule C, with the rates now in effect to California terminals, and the suggested disposition of schedule C items in terminal rates under which the rail carriers might hope to hold a reasonable portion of the traffic. The publication of the tariff which will become effective on November 15, under the commission's more recent order, will cancel a considerable number of the commodity rates which have formerly been carried to the terminals only, 460 items in less than carloads and 151 in carloads. These rates were eliminated on business where it was thought that the volume of the movement was not sufficient to justify their continuation. He said that this would improve the relationship of the rates from the standpoint of the intermediate points, because the commodities will then take the class rates, and the class rates are no lower to the coast than to any intermediate points, and are lower to Phoenix, Reno and many other points than they are to the terminals. Schedule B also will include 58 less than carload and 389 carload items, on all of which the rates from the Missouri river will be the maxima at intermediate points with the percentages added from points further east. These rates will in most instances materially reduce the rates to Reno and other interior points, probably on 85 to 90 per cent of the commodities.

RATES COVER OUT-OF-POCKET COST

Mr. Hastings then explained that, taking the basis used by the commission in the southeastern fourth section case, for the purpose of roughly computing the out-of-pocket cost of transporting traffic, it had been figured that the out-of-pocket cost on the Santa Fe for transporting the commodities in schedule C would average 3.28 mills per ton per mile, and that the rates suggested by the carriers would all yield a greater revenue than that amount. If the carriers are enabled to participate in this traffic to the Pacific coast terminals, he said, on a basis by which they will earn something over the out-of-pocket cost, it will contribute that much to the overhead expenses and other items of expense which are not included in out-of-pocket cost, and so contribute to the total earnings of the road, so that the burden will not be laid entirely upon the other traffic hauled by the transcontinental carriers, that is, the traffic left to them if they were forced to discontinue participation in the terminal business. Moreover, the rail rates to the interior would be reduced by the combinations on the terminals if the roads are allowed to put in the rates which will meet this competition; and this will not only reduce the actual volume of the rates, but will also establish a different, and for the interior man a better, relation of rates as compared with the terminals. The interior man could also have the advantage of water service and water rates by trans-shipment at the Pacific coast ports; but if the rail carriers are permitted to carry these rates to the terminals on a basis which they can afford, the interior man will have the same combination on the terminals at a very much better service by the rail line than he would were he dependent on trans-shipment at Pacific coast ports. If the carriers cannot be given relief and are forced to abandon the terminal traffic to the sea carriers, no possible advantage would accrue to the interior points.

RATES TO THE NORTH COAST

J. B. Baird, freight traffic manager of the Northern Pacific Railway, gave supplementary testimony applying to the northern lines. Mr. Baird introduced an exhibit showing the present rates to the Pacific coast terminals on schedule C commodities, and the rates which it is thought necessary for the carriers to establish as to the terminals. These are substantially the same as the rates to the California terminals, although there are some slight variations. The class rates which were lower to the coast than to Spokane at the present time grade normally from the

east to the west coast. Mr. Baird said that as to the north Pacific coast terminals, the tonnage of schedule C commodities would be somewhere in the neighborhood of 45 per cent of the total traffic. He introduced a number of exhibits as to the rates to the North Pacific coast terminals and intermediate points, similar to those presented by Mr. Hastings. He said that a number of commodity rates had been eliminated from the terminal tariff because the tonnage was so small that the carriers thought they could better afford to eliminate the rates and surrender the business to the water carriers, than to make those rates the basis of their rates to the intermediate territory.

He also produced a statement showing the movement of empty cars over the Northern Pacific from January 1 to August 31, 1914, showing a great preponderance of empty car movement westbound, to show that the Northern Pacific could handle a very much larger tonnage of westbound traffic to Pacific coast territory than it is handling, without materially increasing its transportation expense. The cars could be moved westbound fully loaded, he said, without materially changing the present engine mileage, and with very little additional cost, except such as would be involved in the consumption of fuel. Passing Billings, Mont., this table showed about 24,000 empties in excess of the loads for the period of eight months, so that the Northern Pacific could increase its loaded westbound tonnage to the extent of about 100 cars per day without a considerable increase in operating expense. Mr. Baird said it was not believed that the reduction in the terminal rates would involve any reduction in the revenue because it was expected to get business under those rates that could not be secured at the present time. Many of the present terminal rates secure practically no business now. This preponderance of eastbound movement has prevailed for at least 10 years.

MR. PLAISTED'S TESTIMONY

F. H. Plaisted, assistant director of traffic of the Southern Pacific, explained how the opening of the Panama Canal had changed the conditions affecting transcontinental rates. Mr. Plaisted said that the water service had now been extended to apply not only to New York territory, but to the South Atlantic and Gulf ports, so that these ports are now placed in the same status as the territory adjacent to New York. Water service has also been extended to some of the Missouri river territory, including Galveston and New Orleans. He cited an example of a shipment of pipe and pig iron from Birmingham to the Pacific coast at a rate of 15 cents for the rail haul from Birmingham to New Orleans, and 35 cents for the water haul from New Orleans to San Francisco, making a through rate of 50 cents. The all-rail rate is 65 cents. Such traffic has previously moved by rail in large quantities, but the roads are now unable to hold that traffic against the water competition at that rate, and it is proposed to make a rate of 55 cents if it can be done without reducing the intermediate rates, in order to share in the traffic. Mr. Plaisted took the position that the low rates proposed by the carriers to meet water competition would have no effect in the intermediate points, because if the railroads do not meet the rates the traffic will go by water.

For example, he cited a shipment of paper bags from Sand Hill, N. Y., via the canal at a rate of 55 cents. The former rate by water was 65 cents and the rail rate is \$1. Formerly there was no water service from Boston to the Pacific coast. On August 25, the steamship Atlantic sailed from Boston carrying 2,500 tons of nails, 4,500 tons of structural iron originating in Pennsylvania, 10,000 tons of wire fencing originating in Pennsylvania, 5 cars of automobile tires from Massachusetts, 1 car of paper from Maine, 8 cars of electrical machinery from Lynn, Mass., Schenectady, N. Y., and Pittsfield, Mass., 20 cars of printers' ink from Massachusetts, 1 car of canned goods from Massachusetts and 4 cars of boilers from Massachusetts. He also cited a shipment of 1,200 tons of rails from Lorain, Ohio, to San Francisco, which moved by water at a rate of 30 cents from New York to San Francisco, a reduction of 50 cents under the former rate. In 1913, the total tonnage of rails shipped by water was 609. He also cited a shipment of wrought iron pipe

from Wheeling, W. Va., at a rate of 30 cents from New York to San Francisco and 16 cents from Wheeling to New York. This business has moved almost exclusively by rail in the past. He also cited shipments from Youngstown, Ohio, which had formerly always moved by rail. He also mentioned a company which formerly supplied San Francisco from its Milwaukee branch. Shipments are now made from the New York branch by the Panama Canal. The Sherwin-Williams Paint Company, he said, having plants at Newark, N. J., and Cleveland, Ohio, now ships from Newark. Paper oyster pails, formerly moving from Chicago by rail to the coast, are now moving by the canal. It makes no difference to the interior points whether this traffic goes by sea or by rail, even if the rail rates are lower than those available to the interior points. Referring to the rails from Birmingham, he said that the 55-cent rate proposed by rail was not considered as fairly remunerative, nor did it actually meet the water competitive rates, but it was believed the rail service was worth 5 cents more, and that the railroads could get 55 cents, but no more. He said that if he was figuring on a rate that would meet all expenses and a return on the investment he would have to make the rate higher than 55 cents, but that this would meet the out-of-pocket cost. He said that the boat lines can make rates without notice, while the railways cannot change their rates except on 30 days' notice and the approval of the Interstate Commerce Commission. The roads, of course, do not expect to be able to fully meet the water competition for this reason, but desire to have the restrictions imposed by the long-and-short-haul clause removed as to this traffic, in order to obtain a share of it. If the boat lines reduce their rates too low, of course, the rail lines cannot follow them. Mr. Plaisted said the question of eastbound rates by the canal would have to be taken up, but that it had not been included in this case. However, the same principle would apply. The roads would have to meet water competition at the points of origin, but not at the points of destination. Mr. Baird, on cross examination, said that out of the rates from Chicago to Seattle, 15 per cent would go to the lines between Chicago and St. Paul, out of the rate from New York to Seattle 25 per cent would go to the eastern lines.

Representatives of the state railway commissions of Nevada, Arizona, New Mexico, Idaho, Kansas, Nebraska, Montana and Minnesota were present and cross-examined the witnesses for the railways. Representatives of the chambers of commerce and other commercial organizations were also present from the principal commercial centers of the United States, including both eastern cities and terminal and intermountain cities in the west. The Nevada, Arizona, New Mexico, Idaho and Montana commissions, and shippers from the intermountain territory, opposed the plan of the railways, arguing that to make lower rates to the coast would be discriminatory against their shippers. Representatives of shippers' organizations in the middle western cities appeared in support of the railroads' position. H. C. Barlow, traffic director of the Chicago Association of Commerce, said that unless the commission allows the railways to make lower rates to the coast the entire mid-western section of the country will lose its business with the coast to the Atlantic seaboard cities. It is much cheaper at present, he said, to send goods by rail to New York and thence by water to San Francisco, than to ship across the continent by rail and the eastern cities therefore have an advantage over the middle west.

Mr. Barlow submitted the following exhibit, comparing the water-and-rail rates from Chicago to San Francisco since the opening of the canal with the transcontinental rail rate:

	Combination rate, C. L.	Rail rate, C. L.
Cotton piece goods.....	\$1.55	\$1.60
Starch .....	.85	1.00
Pickles	1.20	2.45
Shoe findings	1.50	1.90
Tinware	1.55	*1.70
Paper articles	1.40	*1.90
Leather	1.35	1.95
Iron and steel .....	.60	.80
Paints .....	.90	.95
Hardware	1.35	1.90
Earthenware	1.40	1.50
Twine	1.10	2.45

*L. C. L.

TESTS OF VANADIUM STEEL RAILS

Convinced from results along other lines that the use of vanadium in rail steel will reduce rail failures and increase the wearing quality of the rails, the manufacturers of this alloy recently had several heats of basic open hearth vanadium steel rolled into rails for test purposes by the Cambria Steel Company. Although the price of vanadium until the past year has been too high to make it commercially practicable in rails, it is now possible to sell rails with this alloy for about \$40 a ton.

Three heats of vanadium steel were made to the following chemical specifications:

Heat	1	2	3
Carbon .....	.45 to .65 per cent	.40 to .52 per cent	.60 to .75 per cent
Manganese	1.10 to 1.40 per cent	1.00 to 1.30 per cent	.75 to 1.00 per cent
Silicon	Under .20 per cent	Under .20 per cent	Under .20 per cent
Phosphorus	Under .05 per cent	Under .05 per cent	Under .05 per cent
Sulphur	Under .05 per cent	Under .05 per cent	Under .05 per cent
Vanadium	4 lb. to ton	4 lb. to ton	4 lb. to ton

In the first two heats, the manganese specified is higher than usual, as previous investigations have shown that with manganese somewhat higher than usual the effect of the vanadium on the physical properties of the steel is still further increased. The third heat, however, conforms to the usual specification for rail steel.

The chemical compositions of the heats were as follows:

Heat	1	2	3
Carbon .....	.55 per cent	.51 per cent	.558 per cent
Manganese	1.51 per cent	1.11 per cent	.78 per cent
Silicon .....	.17 per cent	.12 per cent	.158 per cent
Phosphorus .....	.015 per cent	.010 per cent	.017 per cent
Sulphur .....	.019 per cent	.029 per cent	.025 per cent
Vanadium .....	.148 per cent	.146 per cent	.156 per cent
Actual per cent vanadium added	.168 per cent	.16 per cent	.177 per cent

The manganese in the first heat is higher than called for due to the percentage of loss in manganese addition not being nearly as great as allowed for in usual practice. The percentage of carbon in the third heat is about 5 points below the limit called for due to various mill delays.

The following chemical specifications were used for the carbon steel rails with which the vanadium rails were compared:

Carbon	Manganese	Silicon	Phosphorus
.62 to .75 per cent	.60 to .90 per cent	Under .20 per cent	Under .04 per cent

The production percentage of the vanadium steel or yield of rails per ton of ingots was higher than usual, as shown thus:

Heat	1	2	3
Ingots, weight	121,000 lb.	104,400 lb.	108,000 lb.
Rails, weight	89,500 lb.	79,900 lb.	82,000 lb.
Rails, number	77—1st; 5—2nd	73—1st; 1—2nd	73—1st; 2—2nd
Rails—Scrap	None	None	None
Per cent yield....	74.0	76.9	75.9

All three vanadium steel heats rolled perfectly, and the blooms were all clean and free from seams and cracks. The standard gages were used, indicating that the shrinkage of the steel is the same as for standard carbon steel and that no change in this respect is necessary. Nothing developed in the heating and rolling to indicate that the mill output would be in any way reduced by the use of vanadium steel. The top portion of some of the ingots from the first heat was a little soft or green when bloomed, and they were cropped heavily on this account.

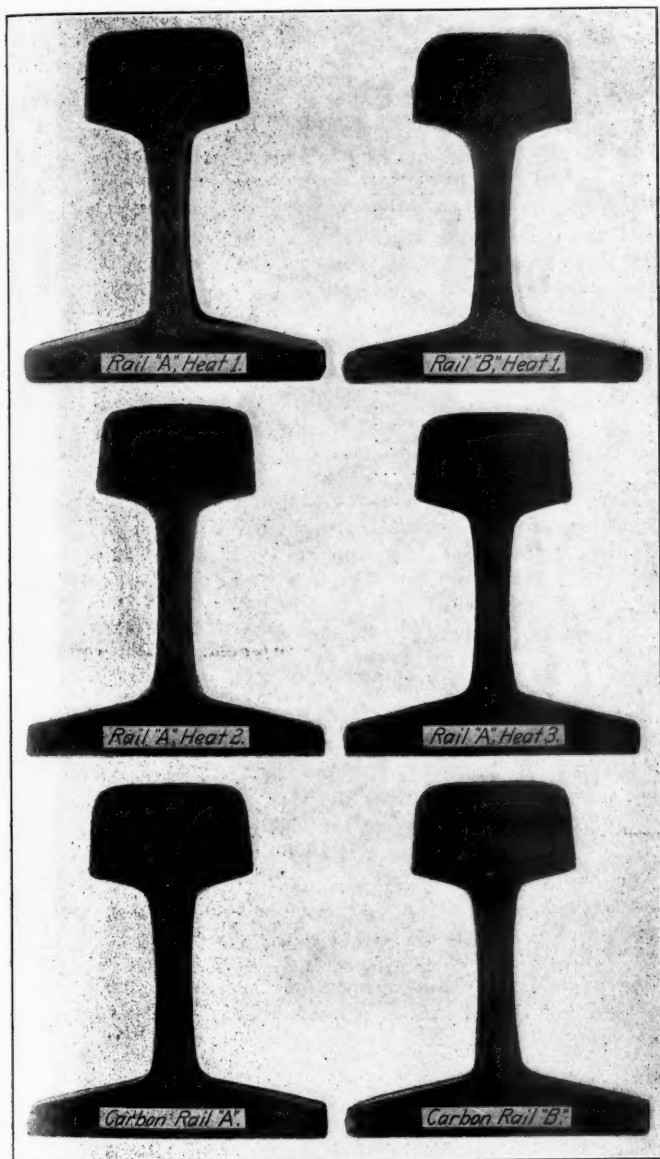
DROP TESTS

When the first heat was made, it was arranged to make drop tests on crop ends from both the "A" and "B" rail of three ingots, representing the beginning, middle and end of the pouring. Through misunderstanding this was not carried out on the second heat, and only three drop tests were made from this heat, one being from a "C" rail crop, as the top blooms from the ingots were rolled into three-rail lengths. The arrangement for two drop tests from the beginning, middle and end of the third heat was carried out, excepting that the tests were made on "C" rail crops instead of "B" rail, on account of the top blooms all having been rolled into three-rail lengths.

The usual requirements for the drop test were followed, the height of the drop being 15 ft. for the carbon rails and 18 ft. for all but two of the vanadium rails. One vanadium rail was tested with the flange up. All the others were tested in the usual manner with the head up. Six one-inch spaces were laid off on

the bottom of the flange in order to determine the ductility or stretch after each blow of the drop, the requirements being 5 per cent or 5/100 in. stretch in two adjacent inch spaces.

The vanadium steel met the ductility requirements in all of the 15 tests and in all but one of the 12 tests made with the 18-ft. drop, the requirement was met under the first drop. The deflection in inches under the first drop in the two cases in which a 15-ft. height was used was 0.7 and 0.9 in., respectively. The similar figures for the 18-ft. drop are 1.0 in four cases, 1.1 in seven cases and 1.2 in one case. The carbon rails in three such drop tests also met the requirement as to ductility, the deflection in two cases under the first drop of 15 ft. being 1.0 and in the third case 1.1. The fractures of the vanadium steel test pieces showed sound interior metal in all cases but one in which a small



Etched Cross Sections of Vanadium and Carbon Steel Rails

indication of piping which showed on one side of the wedge-shaped piece was broken out when the rail was fractured under the drop.

In addition to drop tests, one full length "A" rail from each of the three vanadium heats was broken into ten pieces and the fractures carefully examined. Every fracture was found to be free from any evidence of piping.

PHYSICAL TESTS

Tensile tests, alternating impact, and bend tests and also wear and hardness tests were made from rail crops from each heat. The crops from the "A" rails were taken from the top end of

the rail. Tensile tests were also made from the middle section of each of the vanadium steel rails which were broken under the gag press. Corresponding tests for comparison were made from an "A" and "B" 100-lb. section carbon steel rail. Due to the more rapid cooling of the rail crops, the tests from these show a little higher in elastic limit than the tests from the mid section of the three rails broken in the gag press, as these rails cooled much more slowly on the hot bed.

The average elastic limit of the vanadium steel as shown in 61 tests was 95,000 lb. per sq. in., the corresponding figure for 16 carbon steel tests being 65,000 lb. per sq. in. The tensile strength of the 61 vanadium specimens averaged 129,000 lb. per sq. in., and of the 16 carbon steel specimens 119,000 lb. per sq. in. The ratio of the elastic limit to tensile strength was 70 per cent or more for the vanadium steel as compared with about 57 per cent for the carbon steel. The per cent elongation in two inches averaged 12.1 for 57 vanadium steel specimens and 10.9 for the 16 carbon steel specimens. The per cent reduction of area was 29.2 for the vanadium and 15.9 for the carbon steel.

The bend tests were made on rectangular pieces about 8 in. long. The load was supplied 6 in. from the fixed end of the test piece. The radius of the jaws holding the bend specimen was not over 1/8 in., and the edges of the specimens were not rounded. The alternating impact tests were made on bars turned to 3/8 in. diameter. The bar was held firmly in a vise and the upper end moved backwards and forwards by means of a slotted arm, through a total distance of 3/4 in. at the rate of 600 movements per minute. The distance from the vise to the slotted arm was 4 in. Each movement was accompanied by an impact or blow on the bar by the slotted arm.

The results of these tests show that the vanadium steel compares favorably with the carbon steel in these respects.

The hardness tests were made by the Brinell method. This consists of measuring the impression made by a standard steel ball under a standard load. The tests were made on sections from the same rail crops from which the other tests were made. The sections from the first heat showed an average hardness of about 340; from the second heat about 302, and from the third heat about 293; carbon rail "A" about 248, and carbon rail "B" about 269.

The wear test was made by rotating a test piece 1 in. long by 1 in. diameter between three manganese steel rollers of 3 in. diameter. The two bottom rollers were driven by gears with a different number of teeth, giving the rollers different speeds and causing the test piece to slip as well as rotate, imitating the action of a car wheel on the rail. The test pieces were all taken from the head. A direct load of 110 lb. was applied to the test piece by loading the top roller. In previous tests a load of 220 lb. was used, but owing to the great tendency of soft rails like carbon rail "A" to flow and form a fin or bead the weight was reduced to 110 lb. It was found that the abrasion of the test piece was better with this weight than with the heavier load. The test pieces were weighed before and after test. The loss in weight in milligrams was divided by the original weight of the test piece in order to obtain comparative figures and allow for variations in weight of test pieces. The tests were all run 50,000 revolutions. The relative loss for all specimens was as follows:

Heat		
1	"A"—Crop	16.3
1	"B"—Crop	13.1
2	"A"—Crop	12.8
3	"A"—Crop	12.2
Carbon	"A"	28.8
Carbon	"B"	21.1

CHEMICAL ANALYSES

Chemical analyses were made of rails from each of the vanadium heats to determine whether there was any tendency to segregation and how the vanadium steel compared in this respect with the carbon steel. For this purpose drillings were taken from two locations in the head of the rail. One sample was taken from the top corner of the head, corresponding to the outer portion of the ingot, and the other sample was taken from the junction of the head with the web, corresponding to the axial

center of the ingot where any segregation present would be most certain to be found. No segregation was found in the case of the vanadium steel rails, the results all being within the limit of analytical error.

Sections from the rails tested were polished and etched in boiling dilute sulphuric acid and photographed. Rail "A" of the first heat showed a small amount of piping at the top of the web and in the web. The appearance of the center of the head of this etched section would indicate that the center of the top of the ingot was a little soft or green when bloomed. A few of the ingots from this heat were heavily cropped at the bloom shears on this account. Rail "B" of the first heat showed a few small streaks in the web. Rail "A" of the second heat showed a perfectly uniform, dense structure with no evidence of residual piping. Rail "A" of the third heat showed a uniform, dense structure, with only the very slightest indication of residual piping. Carbon rail "A" is typical of most "A" rail structures and is really better than many because more than the usual discard was made from the top of the ingots in rolling this lot of rails. Carbon rail "B" shows evidence of residual piping, more marked on the left side of the etching.

The time required for etching the vanadium steel rail sections was several times longer than for the carbon rails. The average time required was about 30 minutes, as against about 5 minutes for the "A" carbon steel rail and about 15 minutes for the "B" carbon steel rail. The difference in length of time of etching is a very good indication of the comparative resistance to wear.

CONCLUSIONS

From the results of the tests made on these three heats, the American Vanadium Company recommends the following chemical specification for vanadium steel rails:

Carbon .....	.45 to .60 per cent
Manganese	1.00 to 1.25 per cent
Silicon	Over .10 per cent
Phosphorus	Not over .05 per cent
Sulphur	Not over .05 per cent
Vanadium .....	.4 lb. added per gross ton

BRITISH AND GERMAN EXPORTS OF RAILWAY MATERIAL

The British Board of Trade has recently compiled statistics regarding British and German exports of railway supplies and equipment to the principal markets of the world, which should be of great interest at this time to American railway supply companies that are now studying the possibility of extending their business in foreign markets.

During the year 1912 the total value of railway material exported by Germany to all destinations amounted to \$29,490,200. Of this \$6,844,200 consisted of railway wheels and axles and parts of railway wheels, hubs, tires, frames, etc., and \$22,656,000 of other railway material. British exports in the year 1913 amounted to \$6,050,000 for railway wheels, axles and their parts, and \$25,948,000 for other railway material, making a total of \$31,998,000. Exports from Austria-Hungary in 1913 amounted to \$194,350, of which \$7,000 was for railway wheels, axles, hubs, tires, and parts, and \$187,350 was for other equipment.

The value of exports of railway material, other than rolling stock and railway wheels, tires and axles, exported to all destinations from Germany, United Kingdom and Austria-Hungary, are shown in the following table:

EXPORTED FROM GERMANY (1912)	
Rails, including tramrails	\$14,503,000
Sleepers of iron	3,819,000
Fishplates and bedplates	1,646,500
Fishplate screws and wedges, bolts for sleepers, gage bars, clamp plates, hooked nails	1,250,000
Railway carriage metal fittings, railway buffers	377,000
Parts of railway switches, parts of signals	596,000
Railway carriage springs, buffer springs	464,500
Total	\$22,656,000
EXPORTED FROM AUSTRIA-HUNGARY (1913)	
Rails for railways, pierced or not	\$178,300
Other railway material, including fastenings, frogs, buffers, etc.	9,050
Total	\$187,350

EXPORTS FROM UNITED KINGDOM (1913)

Rails, new perfect rails, for use on steam or electric railways, and conductor rails for electric traction	\$17,289,000
Tram rails, with grooved heads	782,500
Chairs and sleepers (of iron or steel)	3,724,500
Railroad iron or steel, unenumerated	4,052,000
Total	\$25,948,000

The values of railway axles, railway wheels and parts, hubs, tires, frames, etc., exported from Germany to all destinations in the year 1912 to the United Kingdom and to the principal neutral markets of the world were as follows:

To United Kingdom	\$200,000	To Italy	\$1,375,000
" British India	300,000	" Turkey	60,000
" Canada	450,000	" Egypt	65,000
" Australia	995,000	" Dutch East Indies	160,000
" Norway	70,000	" China	310,000
" Denmark	140,000	" Japan	440,000
" France	200,000	" Argentina	80,000
" Spain	195,000	" Brazil	315,000
" Portugal	50,000	" Chile	70,000

British exports of railway wheels and parts, including tires and axles to the various colonial and foreign markets, in the year 1913, were as follows:

	Railway wheels and axles complete	Tires and axles	Total
To British India	\$1,975,000	\$330,000	\$2,305,000
" Canada	60,000	130,000	190,000
" Australia	345,000	1,075,000	1,420,000
" Norway	5,000	5,000	10,000
" Denmark	2,500	23,000	25,500
" France	30,000	10,000	40,000
" Spain	2,500	7,500	10,000
" Portugal	1,000	1,000	2,000
" Italy	2,500	2,500	5,000
" Turkey-in-Asia	5,000	55,000	60,000
" Egypt	115,000	3,500	118,500
" Dutch East Indies	35,000	150,000	185,000
" China	20,000	35,000	55,000
" Japan (and Formosa)	510,000	415,000	925,000
" Argentina	175,000	75,000	250,000
" Brazil	80,000	25,000	105,000
" Chile			
Total	\$3,822,000	\$2,227,500	\$6,050,000

The total of British exports to the above markets exceeds those of Germany, but while the United Kingdom easily takes the first place in supplying this material to British India and Argentina, Germany has taken the bulk of the trade in the other markets specified. The Board of Trade memorandum reports that competition from Germany with British manufacturers of railway axles, wheels and tires during the last few years has been extremely keen. In many foreign and colonial markets, large contracts have been placed with German manufacturers. A number of the contracts which were under execution, or which had just been placed in Germany before the war cannot now be fulfilled in that country.

The table on the following page shows for the year 1912 the values of the principal descriptions of railway material other than rolling stock and railway wheels and axles exported from Germany to the United Kingdom and the principal neutral and colonial markets.

The following statement shows for the year 1913, the exports of certain classes of railway material from the United Kingdom to the colonial and neutral markets principally served by Germany:

Exported to:	Rails	Chairs and sleepers	Miscellaneous
British India	\$4,063,000	\$2,700,000	\$1,297,500
British East Africa	94,000	55,000	13,500
British South Africa	2,138,000	42,500	474,500
Australia	4,595,000	16,500	555,500
Norway	5,500	5,500	11,000
Sweden	20,500	20,500	41,000
Denmark	22,500	129,000	151,500
Netherlands	86,500	86,500	173,000
Belgium	162,500	162,500	325,000
France	78,500	78,500	157,000
Switzerland	36,500	36,500	73,000
Spain	28,500	28,500	57,000
Portugal	1,000	1,000	2,000
Italy	1,000	1,000	2,000
Greece	1,000	1,000	2,000
Servia	1,000	1,000	2,000
Roumania	327,000	327,000	654,000
Russia	34,000	34,000	68,000
Turkey	652,000	19,500	671,500
Egypt	1,000	1,000	2,000
Siam	641,500	387,500	1,029,000
Portuguese East Africa	2,000	500	2,500
Portuguese West Africa	2,000	500	2,500
Morocco	2,000	500	2,500
Dutch East Indies	3,500	3,500	7,000
China	3,500	3,500	7,000

Exported to:	Rails	Chairs and sleepers	Miscellaneous
Japan	4,000	500	1,000
Brazil	319,500	40,000	132,500
Argentina	1,942,000	27,500	555,500
Chile	87,500	500	77,000
Uruguay	76,000	.....	11,000
United States .....	.....	.....	.....
Mexico	120,000	.....	57,500
Total to above markets.....	\$15,542,000	\$3,419,000	\$3,604,500
Total to all destinations..	\$18,071,500	\$3,824,500	\$4,052,000

Austrian exports of railway material are insignificant when compared with those of Germany or the United Kingdom. The bulk of the exports were rails and were sent mainly to Roumania, \$153,050, and Servia, \$24,350.

Germany's principal market for railway material in 1912 and the aggregate amounts sent to each, were as follows: Dutch East Indies, \$2,594,500; Turkey, \$2,366,000; Argentina, \$1,595,500; Sweden, \$1,516,500; Switzerland, \$1,440,000; Netherlands, \$1,488,000; Chili, \$969,500; Brazil, \$905,500; United Kingdom, \$900,500; Japan, \$834,500; and Denmark, \$752,000. The most important item exported was rails, the exports of rails accounting for fully one-half of the total.

The following particulars are given as to the special requirements of some of these markets:

CANADA

The British trade commissioner in his last annual report for Canada, stated that of the gross imports of railway material the British imports represented the proportion of 7.6 per cent, but over 90 per cent of the railway material has been classed as non-competitive, including rails, etc., which for various reasons British firms do not normally supply to the Canadian market. Of the balance, consisting of axles and parts, springs and parts,

for locomotives, tenders and cars from Germany amounted in value to \$27,678, and \$326,082 respectively.

AUSTRALIA

There is said to be a large demand for wrought steel, axles in Australia, the American pattern being preferred. A firm in Sydney reported that instead of ordering 500 sets from the United Kingdom, as at present, they would order 3,000 sets if British manufacture would closely follow the American pattern and quote a lower price. At present the difference in price is said to amount to about 30 per cent in favor of the American axle. The trade in light springs is mostly with the United States. The trade in heavy axles and springs is very largely with the United Kingdom.

The following were the values of rails, fish plates, fish bolts, tie-plates, and rods, switches, points, crossings, and intersections for railways and tramways, imported into Australia from the undermentioned countries in 1910, 1911, and 1912:—

	1910	1911	1912
United Kingdom	\$1,997,735	\$2,498,145	\$4,223,665
Germany	169,320	1,053,785	438,665
All countries	4,103,385	5,399,640	6,500,425

INDIA

The following table shows the values of railway cars and parts imported into British India from the United Kingdom, Germany and Belgium in the years 1910-1911, 1911-1912, and 1912-1913:

	1910-11	1911-12	1912-13
United Kingdom	\$4,845,860	\$4,419,940	\$7,474,890
Germany	57,085	91,490	322,985
Belgium	94,765	37,830	108,490

The values of the imports from Germany show large increases during the three years under view as compared with those from

GERMAN EXPORTS, 1912

Exported to:	Rails	Steel ties	Fish-plates, tie plates	Fishplate screws and wedges, bolts, gage-bars, clamp plates, hooked nails	Metal car fittings, buffers	Switch and signal parts	Car springs, buffer springs
United Kingdom	\$649,500	\$80,000	\$85,000	\$13,000	.....	.....	\$69,500
British India	192,500	93,500	7,500	25,000	.....	.....	.....
Australia	272,500	.....	7,500	8,500	.....	.....	.....
British East Africa.....	70,000	70,000	.....	.....	.....	.....	.....
British South Africa.....	161,500	82,000	146,500	61,000	.....	10,500	.....
Norway	323,000	.....	47,500	37,500	.....	.....	13,500
Sweden	1,363,000	.....	108,500	8,500	5,500	23,500	.....
Denmark	536,500	13,000	119,000	31,500	12,500	12,000	26,500
Netherlands	1,054,500	102,000	82,000	101,000	54,500	18,000	76,000
Belgium	227,000	11,000	.....	18,000	49,500	.....	29,000
France	98,500	27,000	.....	.....	49,000	8,000	10,500
Switzerland	753,500	478,500	12,000	16,500	27,500	113,500	38,500
Portugal	52,500	.....	.....	.....	.....	8,000	5,000
Spain	64,500	23,000	.....	9,500	.....	25,500	28,000
Italy	183,500	12,000	8,000	21,500	28,000	14,500	15,500
Servia .....	.....	.....	.....	29,000	.....	16,500	.....
Roumania	87,500	.....	.....	12,500	.....	64,000	.....
Russia	76,000	.....	.....	10,000	.....	13,000	.....
Greece .....	.....	18,000	.....	.....	.....	.....	.....
Turkey	999,000	853,500	267,000	187,000	.....	53,500	.....
Siam	320,000	.....	59,500	45,000	.....	.....	.....
Morocco	56,000	.....	.....	.....	.....	.....	.....
Egypt	374,000	43,500	32,500	.....	.....	.....	.....
Portuguese East Africa.....	166,000	47,500	9,500	23,500	.....	.....	.....
Portuguese West Africa.....	.....	6,000	.....	.....	.....	.....	.....
Dutch East Indies.....	1,447,000	652,000	143,500	205,000	53,000	59,000	34,500
China	50,500	10,500	9,500	10,500	.....	17,000	.....
Japan	713,000	5,500	20,500	46,500	.....	.....	49,500
Brazil	776,500	23,500	41,500	22,500	7,000	26,000	7,500
Uruguay	79,000	.....	.....	.....	.....	.....	.....
Argentina	1,188,500	228,500	103,500	29,500	14,000	20,000	11,500
Chile	587,000	241,500	60,500	47,000	10,000	20,000	.....
Mexico	70,000	9,500	.....	12,000	.....	.....	.....
United States	82,500	9,500	9,500	.....	.....	.....	.....
Total to above markets.....	\$13,405,000	\$3,078,000	\$1,031,500	\$1,031,500	\$310,000	\$522,500	\$413,000
Total to all markets.....	\$14,503,000	\$3,819,000	\$1,250,000	\$1,250,000	\$372,000	\$596,000	\$464,500

switches and crossings, and tires for locomotives, tenders and cars, the imports show a proportion for the United Kingdom of 11½ per cent, while Germany secured 20.18 per cent. During the year ended March 31, 1913, the imports of axles and parts into Canada from all countries amounted to \$775,130, including \$33,139 worth from the United Kingdom and \$713,848 worth from the United States. The imports of springs and parts from all countries amounted in value to \$108,381 including \$783 worth from the United Kingdom and \$107,203 worth from the United States. The imports of tires for locomotives, tenders, and cars from all countries amounted to \$548,148, including \$134,916 worth from the United Kingdom, and \$87,150 worth from the United States. Imports of axles and parts, and tires

the United Kingdom. In 1910 and 1911, according to consular reports, the German exports of tires amounted to 3,700 metric tons, and railway axles to 1,400 metric tons. Wheels are said to be imported for the most part from the United Kingdom.

EGYPT

The following were the values of iron and steel rails imported into Egypt from the undermentioned countries in 1912 and 1913:

	1912	1913
United Kingdom	\$176,885	\$532,115
Germany	301,635	99,900
All countries	583,250	924,900

The position of the United Kingdom improved greatly in 1913 at the expense mainly of Germany.

THE INCREASE IN MILEAGE BOOK RATES

E. B. Leigh, president of the Chicago Railway Equipment Company, has sent the following letter to all company representatives directing attention to the recent circular letter from the secretary of the Illinois Commercial Men's Association urging members to protest to the Interstate Commerce Commission against the proposed increased price of mileage books already granted by the commission subject to revision.

"This ill directed move on the part of the Illinois Commercial Men's Association (voiced by its secretary) is not only illogical but manifestly unfair; to say nothing of being directly opposed to the view now almost universally held by industrial and commercial interests of the country, which are substantially a unit in the belief that railways are in sore need of increased revenue, and to which end they are now lending their aid. Furthermore, we look upon this effort as being most presuming on the part of the secretary of the Illinois Commercial Men's Association, who seems to overlook the very pertinent fact that in the case of probably over 90 per cent of the firms and corporations employing traveling salesmen, *employers pay their bills*, and are consequently the interested parties, *not* the individual members of the Illinois Commercial Men's Association or similar organizations, and any independent action of such employees is manifestly unwarranted.

"One of the first and foremost duties of the selling representative is to stand by the policy of his employer, and, knowing as you do, our views on the railroad rate question, we feel it wholly unnecessary to more than call your attention to this matter, in full belief you will lend your hearty aid to overcoming any recognition of, or action upon, this attempted undertaking.

"On the other hand, we are equally confident of your active co-operation with us in making the railroad situation better understood, and in your efforts to do all possible within the radius of your personal acquaintance and influence to bring about general business prosperity."

In last week's issue there was published a letter written by Lorenzo Norvell, of Fairbanks, Morse & Co., to the secretary of the Illinois Commercial Men's Association, protesting against his action in attempting to incite the members of that organization to protest to the Interstate Commerce Commission against the increase in mileage book rates on the eastern roads. Among other similar letters sent to Secretary Cavanaugh is the following by C. R. Wescott, president of the M-C-B Company:

"Your favor of the 18th inst. captioned 'Attention, Traveling Men!' has reached me and after reading, as you suggest, have arrived at the conclusion that the Illinois Commercial Men's Association is drifting in decidedly hazardous territory.

"It is certainly to be regretted that the management should have so far forgotten the objects of the association as to permit its good name to be dragged into and its resources dissipated in scattering broadcast a document notable only for the extremely low tone in which it is pitched and the suggestion contained that the membership be further humiliated by being made the cat's-paw of politicians.

"The Illinois Commercial Men's Association, as an accident insurance company, has interest in transportation only, so far as it relates to *safety*—its membership and travelers in general, in securing *safe, comfortable and expeditious service*. Such service, however, costs money to produce and can be reasonably expected only when a fair margin of profit is derived from its rendering.

"If your appeal to the membership was warranted it should have been accompanied by something material—data showing that American railroads are performing a less safe, a less comfortable, or a less expeditious service than is given for a like amount in other parts of the civilized world, that American railroads collectively are at present rates earning a fair return on passenger service rendered. In the absence of such evidence, why should the membership, blindly following your lead, attempt to deny railroads that which is claimed for it-

self, namely, the right to do business on a fairly remunerative basis? The latest authentic information the writer has been able to locate on the subject of passenger rates is found in report of the Interstate Commerce Commission recently issued, after exhaustive research, and is so widely at variance with your ideas as to make a protest based purely upon self-interest, prejudice and unsupported generalities highly presumptuous.

"When railroads, *the largest individual purchasers of material in America*, are denied the privilege of earning sufficient money to buy material with which to keep pace with absolute maintenance requirements, to say nothing of carrying forward contemplated and much needed improvements, a condition anything but healthy is created, a condition that promises anything but safe, comfortable and expeditious service to the traveling public.

"One of the most hopeful signs of the present depressed time is the rapid change taking place in public sentiment, and indicates that the American business man is beginning to realize that upon the prosperity of American railroads his success is, to a marked degree, directly or indirectly dependent.

"The writer is not attempting to justify or apologize for the many indiscreet acts of railroad officials, either past or present, and believes that there are many methods of handling now in force that can, should and will ultimately be improved upon, resulting in substantial economies. These changes, however, will result from intelligent effort rather than by muck-raking methods which appeal only to the vicious and unsophisticated."

PRIVATE RAILWAYS EXCEL IN RUSSIA

The Bureau of Railway News and Statistics has issued the following: "Had Russia's government railways been operated as economically in 1910 as were her private lines the saving in operating expenses would have exceeded \$37,000,000. Such a discrepancy in comparative efficiency of state and private railway operation in Russia is brought out in the annual report for 1910.

"Private companies in European and Asiatic Russia operate 13,256 miles of railway against 28,366 miles operated by the state. In 1910 these companies paid out \$59 to operate, for every \$100 received in gross revenues. Against this showing the state railways spent \$70. Moreover, whereas in 10 years since 1901 the private companies effected a reduction in operating expenses from \$68 for every \$100 revenue to \$59, a saving of over 13.2 per cent, the state railways in the same time contracted their expenses only 1.4 per cent, from \$71 to \$70. With over \$342,000,000 in gross business the government railways would have saved exactly \$37,644,903 had they equalled the private companies' performance.

"Overstaffing of the government railways is largely responsible for this unfavorable showing. Whereas the private companies handle a relatively larger traffic, \$12,989 per mile against \$12,426 on the government roads, they accomplished the work with only 169 employees for every 10 miles against 203 for every 10 miles on the state railways. Even more striking than this discrepancy is the gap between Russia's most efficient roads and railways of the United States, which in 1910 operated with only 70 employees for every 10 miles of line.

"Comparison of rates charged in the two countries likewise demonstrates the efficiency of the United States railway system, for with higher cost of materials, wages four times those paid to Russian railway employees, and with the value of the cent correspondingly higher in Russia than in this country, United States railways received only 0.75 cents per ton mile against 0.94 cents received by Russian carriers. Average receipts per passenger mile were only one-third ours, but 91.5 per cent of the travel was third and fourth class against 1/2 of 1 per cent first class. One day's wage, 70.5 cents, will buy 103 miles of this third and fourth class travel in Russia against 124 miles of first class travel for a day's wage in the United States."

General News Department

The Grand Central station at Houston, Tex., was damaged by fire on October 5, the loss being estimated at between \$10,000 and \$15,000.

The Kansas City Commercial Club is planning a two-day celebration on October 30 and 31, in connection with the opening of the Union station of the Kansas City Terminal Railway.

An unfinished pier of the Philadelphia & Reading Railway at Delaware avenue and Catharine street, Philadelphia, was destroyed by fire on the night of October 14; estimated loss \$250,000.

The Agricultural Department at Washington reports that fines imposed on railroads during the month of August for the violation of the 28-hour law regulating the transportation of cattle amounted to \$25,000. In July the aggregate of the fines was \$9,001, and in June \$4,972. More than half the penalties collected in August came from three roads, the Chicago, Rock Island & Pacific, the Chicago & North Western and the Chicago, Milwaukee & St. Paul. For violation of the live stock quarantine law the Fort Worth & Denver City was fined \$100. The company was convicted of moving cattle affected with scabies from one state to another.

Supplementing the fire notice recently issued the Baltimore & Ohio has furnished trainmen with blanks to notify trackmen of the existence of minor fires. When a trainman discovers a small blaze in the grass along the right of way which is not sufficiently dangerous to justify stopping the train, he is instructed to fill out a printed form, locating the blaze, and throw it off to the first track gang or trackwalker or station agent passed. The blank is marked conspicuously "Go Back and Put Out Fire."

J. Pierpont Morgan has informed the Secretary of the Interior that the owners are willing to sell or lease to the United States the Copper River & Northwestern Railroad in Alaska. It is the desire of his firm and others interested to co-operate with the government in building the government railroad by placing the Copper River property at the government's disposal. The Copper River road is 196 miles long and extends from Cordova, its southern terminus on Prince William Sound, in a northeasterly direction to Kennicott, the location of copper mines. It passes within thirty miles of rich coal fields.

A hearing in the government suit to terminate the Southern Pacific's ownership of the Central Pacific was held in Chicago on October 7 and 8, before Special Master Frank R. Hanna. W. H. Connor, general agent of the Union Pacific at Cincinnati, and formerly general agent of the Southern Pacific at Cincinnati, testified regarding present and former competition between the Union Pacific and Southern Pacific. J. A. Munroe, vice-president, in charge of traffic of the Union Pacific, also testified regarding competitive conditions. The hearing was postponed to a later date on account of the illness of an important witness. Further hearings will be held in San Francisco.

Wells Fargo & Company report gross express receipts for the year ended June 30, 1914, of \$31,862,932, a decrease of \$3,071,881 compared with the previous year. Operating income after taxes was \$1,072,161, a decrease of \$596,587. Other income of \$1,272,432, brought the year's surplus up to \$2,344,595, which is equal to 9.78 per cent on \$23,967,400 capital stock, against 12.71 per cent earned on the same stock the previous year. President Caldwell, speaking of the new rates which went into effect February 1, 1914, said that they had not been in operation long enough to determine to what extent the reductions may be expected to stimulate traffic. The lower rates have influenced a return to the express companies of some of the business which had been previously diverted to the parcel post.

President Fairfax Harrison of the Southern Railway, announcing a reduction, from 5 per cent to 4½ per cent in the dividend on the company's preferred stock, says that the officers of the company have also been asked to make a sacrifice. He has reduced his own salary 20 per cent, and has asked all the other officers receiving annual salaries in excess of \$2,500 to accept temporary

reductions on a descending scale. A man receiving a salary of \$2,700 will be reduced 2 per cent. The officers affected have all accepted the situation with loyal appreciation of the necessity of a spirit of mutual sacrifice. While the actual saving to the company on this account is relatively small, the principle of common interest of all those who draw their livelihood from the railway company has been the controlling motive. Many hundreds of the employees are earning less than before the depression.

Watch the Details; "Trifles Make Perfection"

On the Pittsburgh division of the Pennsylvania Lines West, conductors of trains that pick up cars labeled "inflammable" or "explosive," whether empty or loaded must make the fact known to every member of the train crew, including the engineman. At terminals the yardmaster must give such notice on a prescribed form.

Evening Engineering Courses at University of Pittsburgh

An evening school of graduate courses in engineering will be a new feature introduced at the University of Pittsburgh this fall by the Dean, F. L. Bishop. It is stated that in the Pittsburgh district there are more engineering graduates than in any other district of equal size in the United States, and the University will provide for men who do engineering work during the day an opportunity to study engineering in the evening. Courses will be offered in the valuation of public utilities; civil, electrical, sanitary, mechanical, railway and concrete engineering. The faculty will include Paul M. Lincoln, professor of electrical engineering; Louis E. Endsley, professor of railway engineering; R. T. Stewart, head of the department of mechanical engineering; J. Hammond Smith, head of the department of civil engineering, and Morris Knowles, director of the department of sanitary engineering, all of the University of Pittsburgh. Professor G. W. Case and William S. Moorehead will also assist in the course in the valuation of public utilities, and D. F. Crawford, general superintendent of motive power of the Pennsylvania Lines West of Pittsburgh, will co-operate with Professor Endsley in the work of mechanical railway engineering.

Twelve-ton Pacific Type Engines

The Panama-Pacific International Exposition at San Francisco next year is to have on the grounds a steam passenger railroad. Electricity is not absolutely supreme and all-pervasive. However, the track is to be of 19-inch gage and the locomotives are only 17 ft. long. As in the case of the Centennial Exposition at Philadelphia in 1876, the little railroad is designed not only to ride over but also to be looked at. There will be 2½ miles of road and 5 miles of track, work on which has just been begun. There will be eight or ten Pacific type locomotives equipped with air brakes, standard couplers and electric headlights. Each little giant will haul a train of ten miniature passenger coaches, and running on regular schedules on a double-track system. Each of the coaches, with a width of 42 in. and a length of 20 ft., will contain ten transverse seats, and will seat twenty passengers. With ten coaches to each train and eight trains in operation, 1,600 people can be put in motion at once.

The route, commencing at the terminal at the southeast corner of the Palace of Machinery, will be northerly across the plaza of the exposition ferry slips, to the water front, thence west along the Marina, around three sides of the Yacht Harbor, diagonally across the gardens of the California building, and thence by way of the bayshore and the many state buildings to the race track. The main loading station, at the beginning of the line at the Machinery Palace, will be 300 ft. in length, with five tracks; between which will be elevated loading platforms. The entire line will be double tracked, with rails weighing 39 lb. per yard.

Canadian Ticket Agents' Association

The twenty-eighth annual convention of the Canadian Ticket Agents' Association was held in Chicago on October 6, 7 and 8, and was attended by about 250 members, with members of their families. Addresses of welcome were delivered on behalf of city officers and by W. K. Pattison, president of the British Empire Association. As one feature of the program William P. Leffingwell delivered a stereopticon lecture on the routes to the Pacific coast and features of the Panama-Pacific Exposition to be held next year. The program also included a lake trip, an inspection of the elevated railroad system of the city, and an inspection of the new passenger terminal of the Chicago & North Western, following a luncheon in the dining room of the terminal, at which the members were the guests of the North Western.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 4-7, 1915, Hotel Sherman, Chicago.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Demurrage Commissioner, Boston, Mass. Annual convention in April.
- AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October 22-24, Washington, D. C.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, East St. Louis, Ill. Annual meeting, May 21-24, 1915, Richmond, Va.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, Room 101, Union Station, St. Louis, Mo. Next meeting, May 20-21, 1915, San Francisco, Cal.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—H. C. McConaughy, 165 Broadway, New York. Meetings with American Electric Railway Association.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Semi-annual meeting, November 18, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.
- AMERICAN RAILWAY SAFETY ASSOCIATION.—L. F. Shedd, C. R. I. & P., Chicago. Next meeting, November, Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Annual meeting, July, 1915.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except June, July and August, 220 W. 57th St., New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York. Regular meetings, 2d Thursday in month, at 2 P. M., 11 Broadway, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Annual meeting, December 1-4, 1914, New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., N. W., Washington, D. C. Annual convention, April 28, 1915, Atlanta, Ga.
- ASSOCIATION OF MANUFACTURERS OF CHILLED CAR WHEELS.—George W. Lyndon, 1214 McCormick Bldg., Chicago. Annual meeting, second Tuesday in October, New York.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Annual meeting, 3d week in May, 1915, Galveston, Tex.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, October 26-30, 1914, Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, Soo Line, 112 West Adams St., Chicago. Annual meeting, June 22-25, 1915, Rochester, N. Y.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 8-9, 1914, Richmond, Va.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago. Regular meetings, 2d Monday in month, except July and August, Lytton Bldg., Chicago.
- CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual meetings, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, 2511 Oliver Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh.
- FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, R. F. & P., Richmond, Va. Annual meeting, June 16, 1915, Chicago.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, Rue de Louvain, Brussels, Belgium. Next convention, June 23 to July 6, 1915, Berlin.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, C. & E. I., 922 McCormick Bldg., Chicago. Annual meeting, May 17-20, 1915, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 W. Broadway, Winona, Minn. Next convention, July 14-17, 1915, Sherman House, Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, C. H. & D., Lima, Ohio.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.
- MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Annual convention, May, 1915.
- MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—A. P. Dane, B. & M., Reading, Mass.
- MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Annual meeting, June, 1915.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15-19, 1915, Chicago.
- NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill. Regular meetings, 2d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo. Regular meetings, 3d Friday in month, Kansas City.
- RAILROAD MASTER TINNERS, COPPERSMITHS AND PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May, 1915.
- RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St., New York. Annual meeting, December 10, 1914, Waldorf-Astoria Hotel, New York.
- RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Monongahela House, Pittsburgh.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Association of Railway Electrical Engineers.
- RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Fire Ins. Agt., Mobile & Ohio, Mobile, Ala.
- RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Times Bldg., Bethlehem, Pa.
- RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, L. S. & M. S., Box C, Collinwood, Ohio. Annual meeting, May, 1915.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with Master Car Builders and Master Mechanics Associations.
- RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Association of Railway Telegraph Superintendents.
- RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.
- ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah. Regular meetings, 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, C. R. I. & P., La Salle St. Sta., Chicago.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga.
- SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 A. M., Candler Bldg., Atlanta.
- TOLEDO TRANSPORTATION CLUB.—Harry S. Fox, Toledo, Ohio. Regular meetings, 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.
- TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa. Meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.
- TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Bldg., St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Annual meeting June 15, 1915, Minneapolis, Minn.
- TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Superintendent's office, L. S. & M. S., Detroit, Mich. Meetings monthly, Normandie Hotel, Detroit.
- TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y.
- WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Tuesday in month, except June, July and August, Karpen Bldg., Chicago.
- WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The Augusta-Aiken electric road has requested the South Carolina State Railroad Commission to authorize the increase of the passenger rates on the road from one cent a mile to two cents.

The southwestern railroads have filed tariffs with the Interstate Commerce Commission, to become effective December 1, making an advance of 10 cents a ton in the freight rates on coal from points in Arkansas, Oklahoma, Louisiana, Mississippi, New Mexico and Texas to all destinations in the southwest and south. A similar advance both on coal and coke is proposed from

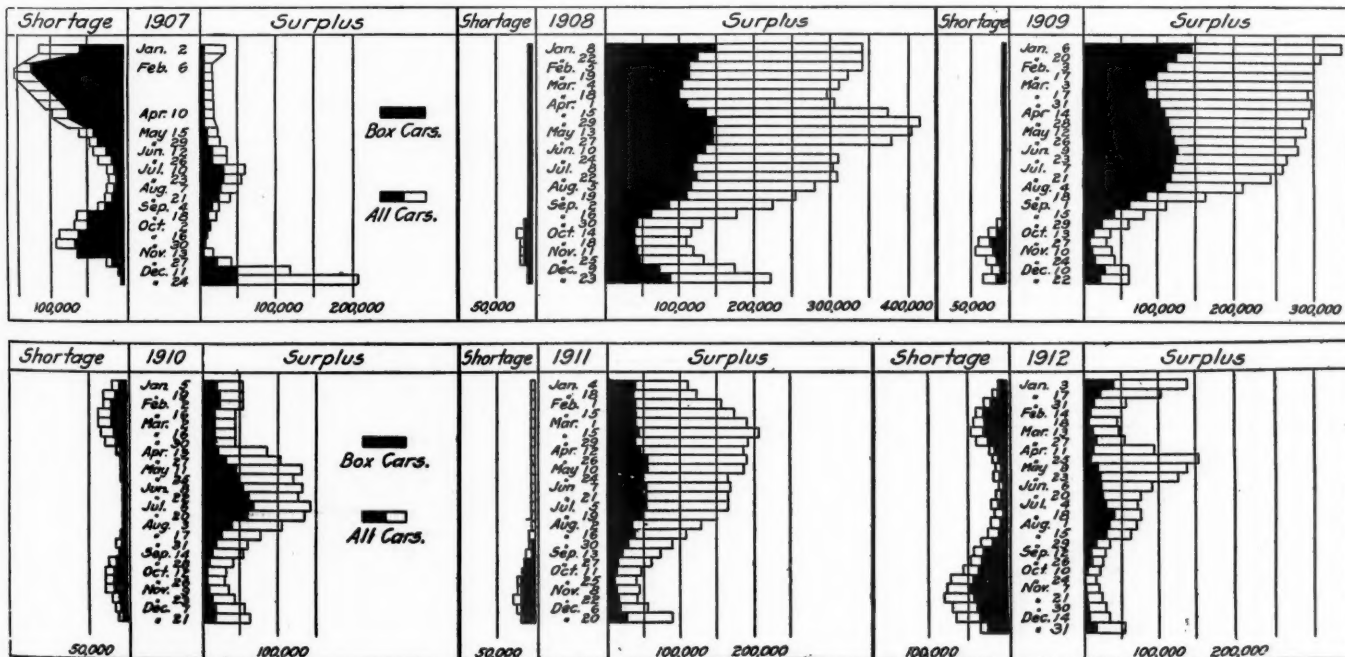
After several conferences, the traffic officers of the eastern and western lines at St. Louis have decided to submit to the Interstate Commerce Commission the controversy regarding whether bridge tolls between St. Louis and East St. Louis on through freight shall be paid by the eastern or the western lines. A complaint is to be filed on behalf of the western lines asking for an order by the commission. For many years the east bank of the river has been recognized as the point of interchange at St. Louis, and the western lines have been absorbing the bridge tolls in the through rate, but they wish to discontinue doing so.

Car Surpluses and Shortages

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 177, giving a summary of car surpluses and shortages by groups from June 1, 1913, to October 1, 1914,

Date	No. of roads.	Surpluses					Shortages				
		Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.	Box.	Flat.	Coal, gondola and hopper.	Other kinds.	Total.
Group *1.—October 1, 1914.....	9	186	515	1,007	591	2,299	181	463	216	9	869
" 2.—" 1, 1914.....	34	1,254	417	4,102	2,784	8,557	74	0	0	10	84
" 3.—" 1, 1914.....	31	4,509	1,333	17,009	3,602	26,453	90	12	0	326	428
" 4.—" 1, 1914.....	12	4,770	1,616	4,534	1,073	11,993	0	30	185	0	215
" 5.—" 1, 1914.....	24	2,074	696	3,763	1,994	8,527	73	2	0	0	75
" 6.—" 1, 1914.....	30	12,788	1,558	3,257	5,285	22,888	0	0	30	0	30
" 7.—" 1, 1914.....	4	1,794	29	564	384	2,771	0	0	0	0	0
" 8.—" 1, 1914.....	16	3,395	468	1,544	2,987	8,394	44	45	260	120	469
" 9.—" 1, 1914.....	15	1,232	132	212	889	2,465	22	0	5	17	44
" 10.—" 1, 1914.....	23	7,347	1,011	2,004	8,964	19,326	0	11	76	48	135
" 11.—" 1, 1914.....	6	16,266	1,521	0	1,922	19,709	0	0	0	6	6
Total	204	55,615	9,296	37,996	30,475	133,382	484	563	772	536	2,355

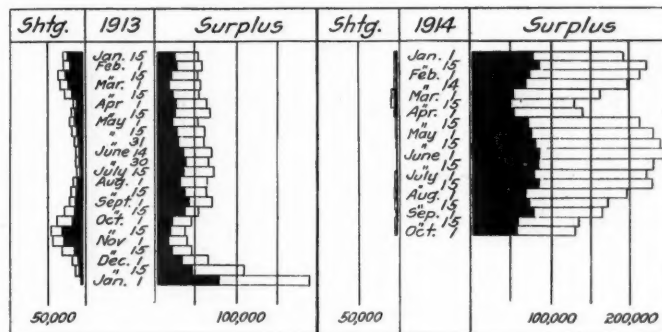
*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.



southern Illinois points and Mississippi river transfer points, including Cairo and East St. Louis, Memphis, Vicksburg and New Orleans to all destinations in Texas.

Practically complete tariffs have been filed with the Interstate Commerce Commission by the railroads in Central Freight Association territory, making an advance of five per cent in the rates as allowed by the commission in the Eastern rate case decision.

P. H. Burnett, industrial commissioner of the Lehigh Valley, has been named by the governor of New York as a representative of the state to the 34th session of the Farmers' National Congress, which is being held this week in Fort Worth, Tex. Mr. Burnett expects to gather at Fort Worth many bits of information which will be of benefit to the farmers along the line of the Lehigh Valley.



Car Surpluses and Shortages, 1907 to 1914

says: The total surplus on October 1, 1914, was 133,382 cars; on September 15, 1914, 138,108 cars, and on October 1, 1913, 41,994 cars.

The reduction in surplus is about equally divided between box, coal and miscellaneous cars. There is very little change in the flat car surplus.

The total shortage on October 1, 1914, was 2,355 cars; on September 15, 1914, 2,059 cars; on October 1, 1913, 31,620 cars.

The total shortage shows an increase of 304 cars since our September 15 report.

The table on the preceding page gives car surplus and shortage figures by groups for the last period covered in the report, and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1914.

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 172, covering car balances and performances for June, 1914, says:

The committee presents herewith statistical bulletin No. 178, covering car balance and performance for June, 1914.

The miles per car per day were 22.7, compared with 22.2 for May. This figure for June, 1913, was 24.3.

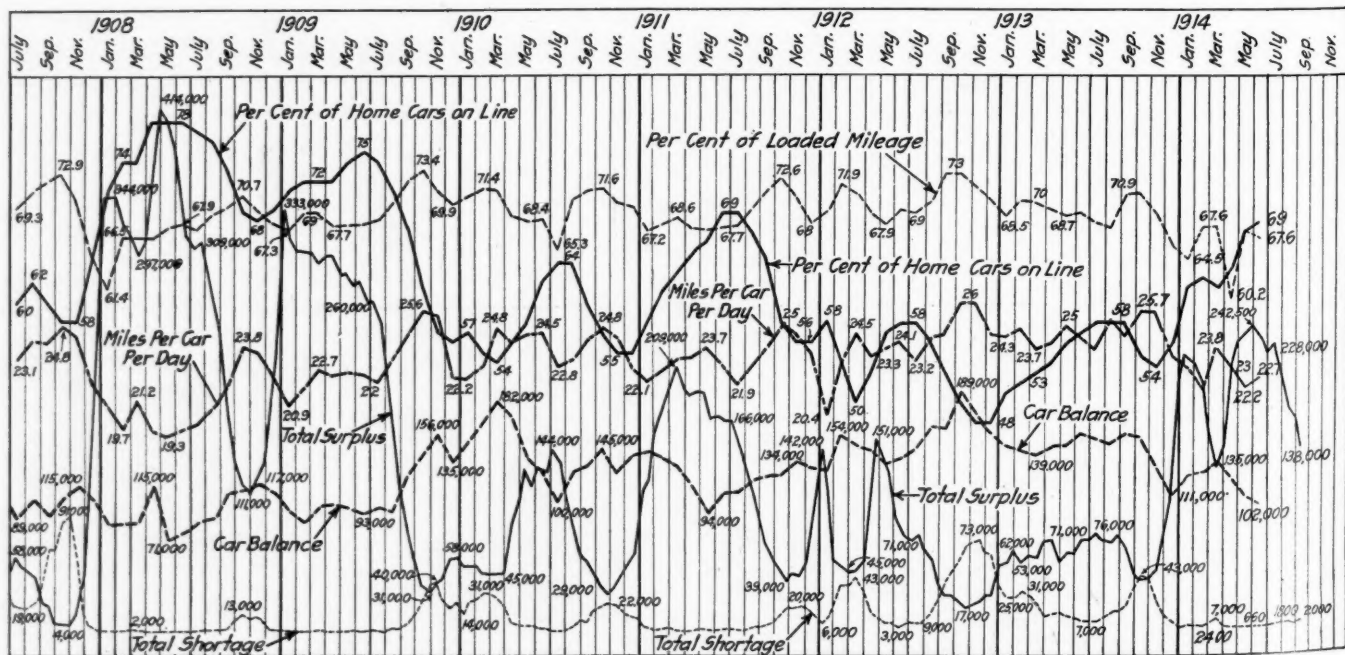
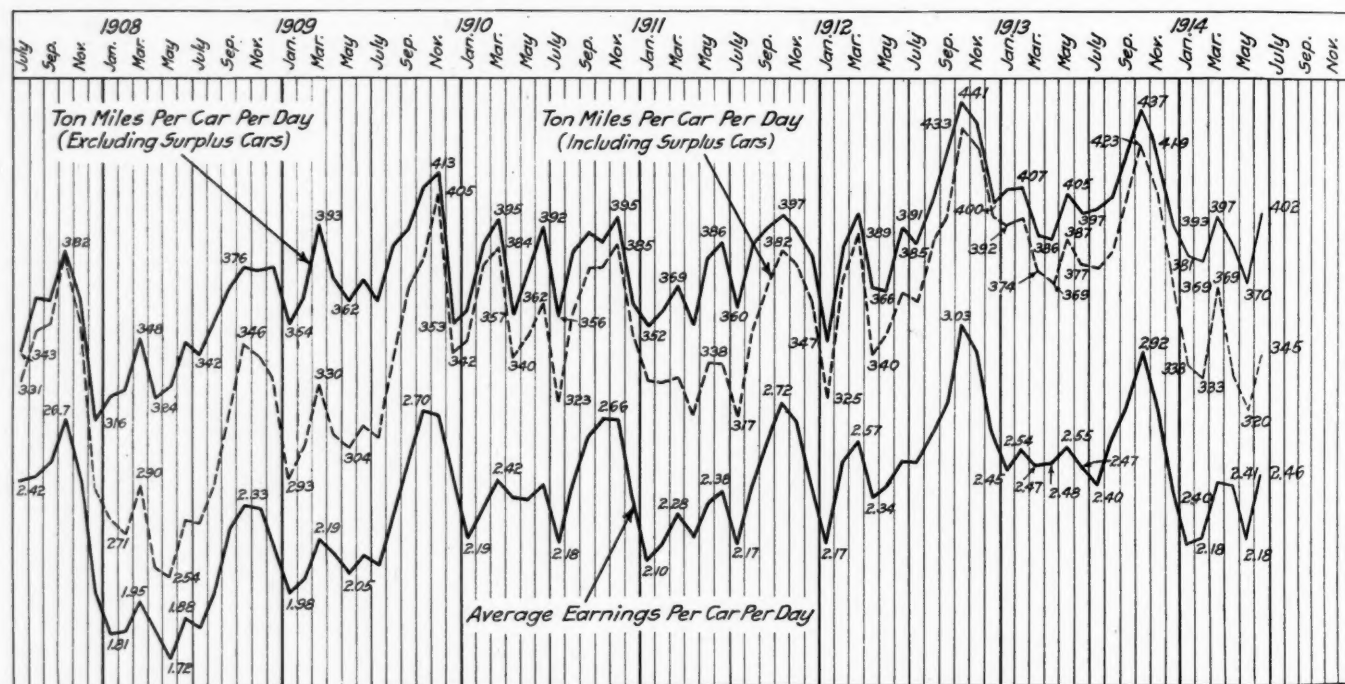
Ton miles per car per day for June were 345, compared with 320 for May. This is a decrease of 8.5 per cent compared with the figure for June, 1913, which was 377.

The proportion of home cars on line was 69 per cent, compared with 68 per cent in May. This is an increase of 13 points over June, 1913.

The per cent of loaded car mileage decreased from 68.0 per cent in May to 67.6 per cent in June. This figure for June, 1913, was 69.0 per cent.

The average car earnings per car per day for all cars on line increased 28 cents to \$2.46 in June. This figure for June, 1913, was \$2.47.

The table on the following page gives car balance and performance in the month covered by the report, and the diagram shows the earnings and car mileage and different car performance figures monthly from June, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE FOR JUNE, 1914

	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla., Dakotas.	Iowa, Ill., Wis., Minn., Dakotas.	Mont., Wyo., Neb.	Kan., Colo., Okla., Mo., Ark.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned.....	88,672	198,551	195,999	165,973	456,097	21,707	144,545	31,851	144,369	179,732	2,338,290
Average number of system cars on line.....	55,348	131,227	130,551	108,917	350,879	10,612	97,149	84,802	84,802	128,101	1,608,471
Railway-owned cars: Average foreign on line.....	38,028	73,314	55,186	42,698	101,747	9,252	46,458	17,100	35,998	31,273	670,828
Total railway-owned cars on line.....	93,376	224,541	185,737	151,615	452,626	19,864	143,607	41,781	120,800	159,374	2,279,299
Excess	4,704	25,990	*10,262	*14,358	*3,471	*1,843	*938	9,930	*23,569	*20,358	*58,991
Per cent of cars on line to total owned:											
Home	66	76	67	65	77	49	67	77	59	71	69
Foreign	43	37	28	36	22	54	32	25	25	17	28
All railways	105	113	95	91	99	92	99	131	84	88	97
Private cars on line.....	3,508	8,697	5,120	9,970	14,806	1,551	8,370	4,046	9,676	2,753	100,266
Total, all cars on line.....	96,884	233,238	190,857	161,585	467,432	21,415	151,977	45,827	130,476	162,127	2,379,565
Per cent of cars in shop.....	9.83	13.49	10.66	11.47	5.81	5.86	10.27	9.16	6.49	5.33	8.65
No. of freight engines owned.....	1,427	2,961	3,475	2,750	7,355	492	2,944	856	2,940	2,620	39,008
Average cars on line per freight engine owned.....	68	79	55	59	64	44	52	54	44	62	61
Total freight-car mileage.....	55,679,040	129,641,450	147,489,669	126,004,532	306,396,527	24,212,632	92,251,607	32,445,453	115,339,612	103,522,577	1,614,210,054
Average miles per car per day.....	19.2	22.3	25.8	26.0	21.8	37.7	21.1	23.6	29.5	21.3	22.7
Per cent loaded mileage.....	71.4	64.7	62.8	67.8	69.9	77.1	68.6	68.4	71.4	74.1	67.6
Ton-miles of freight, including company freight.....	654,818,562	7,822,865,056	2,221,981,601	2,341,511,699	1,758,166,397	3,399,350,653	1,049,727,097	405,013,221	1,614,562,771	1,468,184,880	23,120,249,516
Average ton-miles, including company freight:											
Per car-mile.....	11.8	17.2	15.9	14.0	14.2	15.9	14.1	12.5	14.6	14.2	15.2
Per loaded car-mile.....	16.3	25.1	25.3	20.6	20.5	20.6	20.7	18.2	20.5	19.1	22.5
Per car per day.....	223	320	409	363	313	598	293	295	423	302	345
Gross freight earnings.....	\$7,473,292	\$47,519,492	\$12,662,940	\$20,529,337	\$28,698,044	\$2,965,537	\$8,938,830	\$3,452,502	\$17,165,542	\$10,622,345	\$172,073,654
Average daily earnings: Per car owned.....	\$2.81	\$2.22	\$2.15	\$4.12	\$2.35	\$4.55	\$1.98	\$3.61	\$4.00	\$1.97	\$2.50
Per railroad car on line.....	2.67	1.79	2.27	4.51	2.36	4.81	2.07	2.75	4.81	2.22	2.57
All cars on line.....	2.57	1.72	2.21	4.23	2.28	4.62	1.96	2.51	4.46	2.18	2.46

* Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

A hearing was held at Toledo, Ohio, on October 9, before Examiner Carmalt on the relations between the trunk lines and the industrial roads.

Storage-in-Transit Rates on Cotton

The commission has issued the following statement:

For the purpose of assisting the cotton people and carriers in meeting the extraordinary demand for the storage of cotton occasioned by the European war, and for the purpose of providing temporary warehousing space under arrangements approved by the secretary of the treasury and the federal reserve board; and for the purpose of permitting the carriers to recognize the warehouses as points for the storage of cotton in order that such points should be given the benefit of transit privilege, the commission has authorized the carriers to publish tariffs establishing regulations and charges governing storage during the cotton year ending August 31, 1915, in substance as follows:

1. Cotton shipped for warehousing must be consigned to the warehousing point and freight thereto paid on basis of the full local rate.

2. Upon reshipment the shipper will be required to surrender to the agent of the line bringing the cotton into the warehousing point the paid freight bill covering that identical cotton. The number of bales, marks and weights, as forwarded from the warehousing point, must conform to the paid freight bill, and in addition the shipper will be required to certify on the back of the paid freight bill that the cotton tendered is the identical cotton received thereunder. The shipper will also be required to surrender to the railway agent at the time of reshipment the bill of lading covering the movement of the cotton into the warehousing point, unless the bill of lading for such shipment shall have been previously surrendered to the railway.

3. Thereupon the agent will issue a through bill to the further final destination at the through rate from the point of origin to such final destination in effect at the time of the original shipment into the warehousing point, plus three cents per 100 lb., provided such final destination is a point to which there are established through rates in effect from the original point of shipment via the warehousing point (provided, that at the option of any interested line the minimum through rate will be that from the warehousing point plus the stoppage charge of three cents per 100 lb.).

Shipments will be waybilled out of the warehousing point at the balance of the rate, plus the stoppage charge of three cents.

STATE COMMISSIONS

The application of the Illinois railroads for permission to increase grain rates five per cent has been denied by the Illinois Public Utilities Commission.

The Missouri Public Service Commission has suspended tariffs recently filed by the western railways canceling the concentration privilege on poultry and dairy products.

The commissions of both North Carolina and South Carolina have given approval of the discontinuance of certain trains on the Southern Railway, as applied for by the company, on the ground that income had been seriously diminished by the dullness of general business.

The Kansas Public Utilities Commission has filed complaints with the Interstate Commerce Commission against the proposed advance of five cents per 100 lb. in the rates on codfish goods from points east of the Mississippi river to points in Kansas; also against new tariffs filed by the western roads increasing the demurrage charges for refrigerator cars.

Citizens of East Berlin, Adams county, Pennsylvania, have appealed to the Public Service Commission of that state to compel W. G. Leas to show cause why he does not operate the East

Berlin Railroad. This road extends from East Berlin south about 7 miles to a junction with the Western Maryland, between Hanover and Gettysburg. The property was bought at receivers' sale in July, and on September 9 its operation was discontinued. Now the residents of East Berlin have no railroad facilities and the nearest railway station is New Oxford, seven miles distant.

The Illinois Public Utilities Commission at a hearing in Chicago on October 12, which was attended by a large number of shippers and railroad officials, announced its intention of formulating a new set of switching rules and regulations for the state. The present rules, reached by agreement of a committee of railroad men and shippers about three years ago, have been the subject of many complaints, and the commission has decided to make an investigation of the entire subject. Two committees, one representing the shippers, and another representing the railroads, will be appointed to meet with one of the commissioners to draft uniform rules.

The Missouri Public Service Commission, on October 6, issued an order denying the application of the Missouri railroads to put into effect increased passenger, freight and excess baggage rates which were filed with the commission on September 15. The commission said that the roads were without authority to change rates fixed by statutes by simply filing tariffs without first obtaining authority to do so from the commission. The commission declined to issue any such order without a protracted investigation, and therefore denied the petition. It announced, however, that it would consider the application of the roads for increased rates at a hearing to begin at Jefferson City on October 27, when it will undertake a detailed investigation.

The New York State Public Service Commission, Second district, has received petitions from large numbers of citizens asking the commission to forbid the discontinuance of passenger and freight trains on the line of the Buffalo & Susquehanna Railway between Buffalo and Wellsville, which has been announced to take effect November 1. It is said that milk to the amount of 6,000 gallons is brought into Buffalo each day by this road. Justice Charles H. Brown of the State Supreme Court tells the commission that "consternation seems to have swept the whole of the Genesee Valley" because of the proposed suspension of traffic, which is looked upon as a calamity. It is said that the Pennsylvania Railroad has made a proposition to operate the line in question, which is 90 miles long.

PERSONNEL OF COMMISSIONS

F. H. Bagley, signal supervisor of the L. C. & L. division and the Louisville terminals of the Louisville & Nashville, has taken a position as senior signal engineer with the valuation department of the Interstate Commerce Commission of the southern district. His headquarters are at Chattanooga, Tenn.

COURT NEWS

The appellate court of Kentucky has sustained the decision of a lower court imposing a fine of \$1,900 on the Nashville, Chattanooga & St. Louis for failure to make reports of values required by the state auditor under the taxing laws of the state.

Judge Adams of the United States Circuit Court at St. Louis, in charge of the receivership of the Wabash, has ordered the receiver to apply to the Interstate Commerce Commission and the various state Public Service Commissions for authority to increase passenger and freight rates. The order was issued after Receiver Pryor had submitted the annual report showing that with the second largest gross earnings in the history of the road, it was unable to pay its fixed charges.

The United States Department of Agriculture announces that a railroad company and two individuals have been fined in court for shipping lumber from an area quarantined by the government on account of the gipsy and brown-tail moths. The fines were imposed as follows: Boston & Maine Railroad Company, five violations, \$125; L. M. Perkins, agent for the B. C. Jordan estate, Alfred, Me., \$75; L. L. Clark, Hollis, Me., \$50. The quarantine became effective on November 25, 1912, and was designed to prevent the spread of the injurious insects named.

Railway Officers

Executive, Financial, Legal and Accounting

G. F. Buskie has been appointed auditor of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo., succeeding E. B. Pierce, resigned.

E. W. Grice, assistant general manager of the Chesapeake & Ohio at Richmond, Va., has been appointed assistant to president, with headquarters at Richmond.

G. K. Weeks has been elected president of the San Francisco-Oakland Terminal Railways, with headquarters at Oakland, Cal., succeeding W. A. Bissell, resigned.

George P. Johnson, who resigned recently as general manager of the Chesapeake & Ohio, has been elected president of the Virginia-Carolina and the New River, Holston & Western, succeeding W. E. Mingea, resigned.

Bryan Snyder, secretary and traffic manager of the Marshall & East Texas, has been elected vice-president and general manager, with headquarters at Marshall, Tex., in place of J. E. Votaw, resigned. Mr. Snyder will have charge of all departments and the position of traffic manager is discontinued.

J. W. Comiskey has been appointed car accountant of the Galveston, Harrisburg & San Antonio, the Texas & New Orleans, the Houston & Texas Central, the Houston East & West Texas and the Houston & Shreveport, with headquarters at Houston, Tex., succeeding D. B. Keiser, retired under the pension regulations. Mr. Comiskey has been chief clerk in the office of Mr. Keiser.

L. A. Farquhar, whose appointment as auditor of the Norfolk Southern, with headquarters at Norfolk, Va., has been announced in these columns, was born on July 17, 1880, near Hempstead, Tex., and graduated in 1896 from the Hempstead high school. He began railway work on August 1, 1900, as a clerk in the local office of the Houston & Texas Central, at Hempstead, Tex., and subsequently was cashier in the same office. In November, 1905, he was appointed joint station ticket agent of the Houston & Texas Central and the Missouri, Kansas & Texas at Austin, and in August of the following year became chief clerk to division superintendent of the Houston & Texas Central. From June 9, 1909, to November 18, 1911, he was in the service of the Sunset-Central Lines consecutively as chief clerk in the general accountant's office, traveling and general office accountant, chief clerk to auditor, and accountant in the auditor's office at Houston. He was then special accountant on efficiency work in the controller's office of the Union Pacific and Southern Pacific Systems at New York until January 31, 1913, and then became special accountant on efficiency work in the controller's office of the Union Pacific System at New York, which position he held at the time of his recent appointment as auditor of the Norfolk Southern as above noted.

Operating

W. T. Tyler has been appointed division superintendent of the Northern Pacific, with headquarters at Pasco, Wash.

E. C. Penn has been appointed chief dispatcher of the Virginian Railway, with headquarters at Princeton, W. Va., succeeding A. A. Owen, deceased.

R. T. Arthur has been appointed trainmaster of the Missouri, Kansas & Texas at Denison, Tex., succeeding A. N. Williams, resigned, to take service with another company.

E. D. Hogan has been appointed superintendent of transportation of the New Orleans, Mobile & Chicago, with office at Laurel, Miss., succeeding D. W. Davis, assigned to other duties.

J. B. Purkheiser, trainmaster of the Baltimore & Ohio Southwestern at Cincinnati, Ohio, has been transferred to Seymour, Ind., as trainmaster of the Cincinnati & Louisville district, and E. J. Lampert has been appointed trainmaster of the Cincinnati terminals.

T. S. Mahoney, superintendent of the New Orleans division of the Texas & Pacific, has been appointed superintendent of the Transcontinental division, with headquarters at Texarkana, Tex., succeeding R. B. Ayres, resigned. Mr. Ayres has been with the Texas & Pacific continuously since 1880.

C. C. Walker, assistant to general manager of the Chesapeake & Ohio at Richmond, Va., has been appointed superintendent of passenger transportation, and E. P. Goodwin, superintendent of transportation at Richmond, has been appointed superintendent of freight transportation, both with headquarters at Richmond, Va.

Traffic

Robert W. Dowe has been appointed live stock agent of the International & Great Northern, with headquarters at Eagle Pass, Tex.

Gordon Alexander, traveling freight agent of the Cleveland, Cincinnati, Chicago & St. Louis at New York, has been appointed general eastern freight agent, with headquarters at New York.

W. P. Hinton, assistant passenger traffic manager of the Grand Trunk Pacific at Winnipeg, Man., has been appointed assistant passenger traffic manager also of the Grand Trunk, and his headquarters have been transferred to Montreal, Que.

Stuart A. Allen, general agent, freight department, of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio, has been appointed general manager of the Continental Line and Central States Despatch, to succeed T. H. Noonan, deceased.

O. P. Bennett, general agent, freight department, of the Chicago & Alton at Minneapolis, Minn., has been appointed general agent, traffic department, at Kansas City, Mo. C. R. Murray, district passenger agent at Detroit, Mich., has been appointed western passenger agent at Kansas City. W. C. Mueller, general agent, passenger department, at Kansas City, has been appointed general agent, traffic department, at Milwaukee, Wis. W. J. Dibble, commercial agent at Kansas City, has been appointed general agent, traffic department, at Minneapolis.

William T. Grier, general coal and freight agent of the Lehigh Valley at New York, has been appointed to the new position of general traffic manager in charge of passenger and freight business, with headquarters at New York. He was born on April 8, 1886, at Philadelphia, Pa., and was educated in the common schools. He began railway work in August, 1883, and was office boy and stenographer in the coal traffic department of the Philadelphia & Reading until 1888. He was then to August, of the following year, assistant chief clerk in the freight department of the same road. From August, 1889, to November, 1895, he was chief clerk in the coal, freight and passenger departments of the Beech Creek Railroad, now a part of the New York Central &



W. T. Grier

Hudson River, and was then to June, 1906, general manager of the Delaware River & Union. In June, 1906, he was appointed coal freight agent of the Lehigh Valley, and in January, 1912, was appointed general coal and freight agent, which position he held at the time of his recent appointment as general traffic manager of the same road as above noted.

Engineering and Rolling Stock

G. F. McKenzie, section foreman on the Houston & Texas Central, has been appointed roadmaster at Corsicana, Tex.

R. F. Morkill, signal engineer of the Grand Trunk Railway

System, has been gazetted a lieutenant in the Engineers' Corps, Canadian Contingent, and has left with his company for active service in England and France.

C. S. Yeaton, supervisor of locomotive operation of the Chicago, Rock Island & Pacific at El Reno, Okla., has been appointed road foreman of equipment at that place, succeeding O. F. Covalt, assigned to other duties.

Harold Knight, whose appointment as signal engineer of the Erie, with headquarters at Jersey City, N. J., has been announced in these columns, was born in October, 1881, at Stockport, Pa., and was graduated from Lawrenceville school in 1901, and from Yale university in 1904. In August of the latter year he began railway work as a rodman on the Susquehanna division of the Erie. The following March he went to the Pennsylvania Railroad as rodman at Elmira, N. Y., and in July, 1905, returned to the service of the Erie as transitman on the Susquehanna division. Shortly afterward he was appointed assistant engineer on the same division, and in June, 1908, he was made division engineer of the Allegheny division. On November 1, 1912, he was appointed division engineer of the New York division, which position he held at the time of his recent appointment as signal engineer of the same road as above noted.

OBITUARY

C. J. Drury, division master mechanic of the St. Louis & San Francisco at Sapulpa, Okla., died on September 30, at the age of 36.

George N. Mills, who had been real estate and tax agent of the Missouri district of the Chicago, Burlington & Quincy since 1897, died at his home in St. Louis, Mo., October 7.

Oliver S. Lyford, vice-president of the Chicago & Eastern Illinois, died at the home of his son, W. H. Lyford, at Wheaton, Ill., on October 12, aged 91 years. He had been connected with the Chicago & Eastern Illinois since January, 1878, and had been in railway service 68 years.

George A. Goodell, general manager of the Northern Pacific lines east of Paradise, Mont., with headquarters at St. Paul, Minn., died on October 3, aged 59 years. Mr. Goodell had been in railway service since July, 1868, when he began as messenger boy for the Chicago, Burlington & Quincy. He was successively telegraph operator, station agent and train despatcher of that road until July, 1876, when he became ticket agent of the Toledo, Peoria & Warsaw at Burlington, Iowa. The following October he went to the Burlington, Cedar Rapids & Northern, and was consecutively telegraph operator, station agent, train despatcher, superintendent of telegraph, assistant superintendent and superintendent, until March, 1902, when he was appointed general superintendent of the Chicago Great Western at St. Paul. He left that road in December, 1907, to become general superintendent of the Central district of the Northern Pacific, and in November, 1909, he was promoted to general manager of the lines east of Paradise.

George A. Clark, president of the Tennessee, Kentucky & Northern, died at the Hyde Park Hotel, Chicago, on October 11, aged 45 years. He began railway work in 1880 with the Chicago, Milwaukee & St. Paul as messenger, and subsequently was employed with that road, the Chicago, St. Paul, Minneapolis & Omaha, the Atchison, Topeka & Santa Fe, the St. Paul & Duluth, the Chicago Great Western, the Great Northern and the "Soo" Line successively as clerk, agent, telegraph operator, train despatcher and trainmaster. From 1895 to January, 1903, he was with the Illinois Central as trainmaster, superintendent of the Omaha division at Ft. Dodge, Iowa; superintendent of the Springfield division at Clinton, Ill., and superintendent of the Tennessee division at Fulton, Ky. He then became general manager of the Tennessee Central, and subsequently was vice-president and general manager until December, 1905, at which time he went to the New Orleans, Texas & Mexico as vice-president. In July, 1908, Mr. Clark returned to the Tennessee Central as general manager, and in October, 1909, he was appointed receiver of the Cincinnati-Nashville Southern, which office he held until he became president of the Tennessee, Kentucky & Northern in September, 1912.

Equipment and Supplies

LOCOMOTIVE BUILDING

MITSUI & COMPANY, New York, are in the market for 3 0-4-2 type locomotives.

THE RICHMOND, FREDERICKSBURG & POTOMAC is in the market for 5 Pacific type locomotives.

THE NEW ZEALAND GOVERNMENT RAILWAYS are inquiring for a number of Pacific type locomotives.

THE UNITED STATES GYPSUM COMPANY, Chicago, is in the market for one six-wheel switching locomotive.

THE CITIZENS' GAS COMPANY, Indianapolis, Ind., is in the market for one six-wheel switching locomotive.

THE HOBOKEN MANUFACTURERS' RAILROAD has ordered one switching locomotive from the Baldwin Locomotive Works.

THE CUBAN-AMERICAN SUGAR COMPANY, New York, has ordered one Mogul type locomotive from the Baldwin Locomotive Works.

THE RANDOLPH MACDONALD COMPANY, Toronto, Ont., has ordered one four-wheel switching locomotive from the American Locomotive Company.

THE CRANFORD COMPANY, Brooklyn, N. Y., is reported to have ordered one four-wheel switching locomotive from the American Locomotive Company. This item has not been confirmed.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS, reported in the *Railway Age Gazette* of October 2 as being in the market for 7 Pacific and 10 Mikado type locomotives, is now reported to have postponed its inquiries until after the first of the year.

CAR BUILDING

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is in the market for 6 steel passenger and 2 steel postal cars.

OKURA & COMPANY, New York, are asking prices on 1,000 30 and 40-ton standard gage cars for export.

THE SOUTHERN PACIFIC is in the market for 16 coaches, 6 combination passenger and smoking cars, and 2 combination passenger and express cars.

THE LOUISVILLE & NASHVILLE has ordered 1,000 underframes which it will apply in its own shops. The same road is also planning to place an order for 870 cars in the near future.

IRON AND STEEL

THE UNION TERMINAL COMPANY has ordered 1,285 tons of steel for the Union station at Dallas, Tex., from the American Bridge Company.

THE MISSOURI PACIFIC has ordered 228 tons of material for a viaduct at Atchison, Kan., from the Morava Construction Company, Chicago.

SIGNALING

The Northern Pacific has given the Union Switch & Signal Company a contract for a mechanical interlocking plant at Steilacoom Creek lift bridge, Washington.

THE QUEENSLAND GOVERNMENT RAILWAY SHOP—The principal shops of the government owned railways of Queensland, Australia, are at Ipswich. These shops were established about 1869 and over \$2,500,000 has been expended on them. The employees number 1,700. The locomotives and other rolling stock of the railways are built and repaired here, and the yearly output has recently been about 16 large locomotives, 50 passenger cars and 500 freight cars. There are, it is claimed, no car shops in the world in which native timbers of such great variety and beauty of grain and color are utilized as at Ipswich.

Supply Trade News

Spencer Van Cleve, president of the Erie Foundry Company, died on September 29.

I. H. Case, railroad representative of the Dearborn Chemical Company, Chicago, has resigned from his position with that company.

The Independent Pneumatic Tool Company, Chicago, has appointed V. W. Robinson its representative in Michigan, with headquarters at Detroit. F. J. Passino, the former representative in Michigan, has been appointed representative in the southwest to succeed H. F. Finney, promoted to a position in the general sales office at Chicago.

Frank W. Skinner, for many years senior associate editor of the *Engineering Record*, has opened consulting offices at 45 Broadway, New York, and in the Crabtree Annex, St. George, Staten Island, and is associated with C. E. Fowler, of Seattle, Wash. Mr. Skinner will continue in the field of bridge and structural steel work, foundations and general civil engineering field construction methods, operations and plant with which he has long been extensively identified, and will also specialize in the preparation of engineering cases for litigation, expert witness research and testimony, preparation and mediation of cases in controversy, and in the preparation of technical, commercial, popular and miscellaneous descriptions of engineering construction.

TRADE PUBLICATIONS

CRANES AND HOISTS.—The Canton Foundry & Machine Company, Canton, Ohio, has issued a leaflet descriptive of the new Canton back geared portable floor crane and hoist.

FIRE SHOVELS.—The National Malleable Castings Company, Cleveland, Ohio, has recently issued circular No. 53, descriptive of the company's line of malleable iron fire shovels.

ELECTRICAL APPLIANCES.—The Sprague Electric Works of the General Electric Company, New York, has issued bulletin No. 48701, descriptive of Sprague Electric Dynamometers.

PNEUMATIC TOOLS.—The Monarch Pneumatic Tool Company, East St. Louis, Ill., has issued bulletin No. 18-A, illustrating a large number of the Monarch line of pneumatic tools.

PUMPING MACHINERY.—The American Well Works, Aurora, Ill., has issued a folder illustrating and treating of the advantages of the American deep well turbine centrifugal pumps.

RAILWAY SIGNAL APPARATUS.—The Union Switch & Signal Company has recently issued bulletins Nos. 79 and 80 descriptive, respectively, of the Model 14 Electric Crossing Gate and the Model 13 Low Voltage Direct Current Switch Movement.

IRON.—The American Rolling Mill Company, Middletown, Ohio, has recently issued a booklet, the idea of which is well expressed by the quotation from Thackeray that is printed on the cover: "Next to excellence is the appreciation of it." The booklet contains 28 pages of letters from persons and companies who have used Armco-American ingot iron and have desired to express their appreciation of it.

ELECTRICAL APPARATUS.—The General Electric Company has recently issued bulletins No. 48014, 42800 and 46390. The first deals with mine hoist equipment, takes up the question of the economy of electric drive, and treats of the general subject of underground hoists, their operation and control. Bulletin No. 46390 describes the Thomson direct current test meter, type CB-5, which combines in one standard several capacities covering a range from light load to full load, and thereby makes possible rapid testing, since no time is lost in changing standards. Bulletin No. 42800 is a reprint of an article on air compressors for foundry use which appeared in the *General Electric Review*. This article compares centrifugal compressors with the ordinary fan blower and the positive pressure blower. It aims to show the superiority of the centrifugal compressor for foundry work. All three bulletins are profusely illustrated.

Railway Construction

CAMPBELLFORD, LAKE ONTARIO & WESTERN.—See Canadian Pacific.

CANADIAN PACIFIC.—Plans have been made for extending the Georgian Bay & Seaboard from Bethany Junction, Ont., to Belleville, also for an extension of the Campbellford, Lake Ontario & Western from Shannonville to Kingston. The extensions have been surveyed, but the company has no intention of extending these lines in the near future.

The route map for a projected line from Dunelm, Sask., southwest to Instow has been approved by the minister of railways, but the company does not expect to start the construction work in the near future. Dunelm is nine miles south of Swift Current, on the line to Vanguard, and Instow is about 28 miles south of Gull Lake.

The Coronation sub-division of the Alberta division has been extended from Monitor, Alta., east to Kerrobert, Sask., 74.6 miles. The Suffield sub-division has been extended from Retlaw, Alta., west to Lomond, 27.1 miles, and the Columbia Valley sub-division of the British Columbia division has been extended from Spillimacheen, B. C., south to Edgewater 18.5 miles.

CEDAR RAPIDS & IOWA CITY.—The Mt. Vernon division has been extended from Mt. Vernon, Iowa, to Lisbon, two miles.

FOURCHE RIVER VALLEY & INDIAN TERRITORY.—This road has been extended from Bellevue, Ark., to Thornburg, 5.6 miles.

GEORGIAN BAY & SEABOARD.—See Canadian Pacific.

* **JONESBORO, LAKE CITY & EASTERN.**—This company, which operates a 63-mile line from Jonesboro, Ark., to Barfield, is planning to build two extensions, it is said, to timber lands.

MCKINNEY, BONHAM & PARIS INTERURBAN.—Preliminary surveys have been made, it is said, and rights of way are being secured to build a 60-mile line in Texas. L. A. Scott, president, and J. F. McReynolds, director, McKinney, Tex.

MISSOURI ROADS.—Preliminary work is now under way, it is said, for a line to be built from Springfield, Mo., southeast to Mountain Home, Ark., about 80 miles. E. C. McAfee, Woodruff building, Springfield, is interested.

NEW YORK SUBWAYS.—Bids were recently opened by the New York Public Service Commission, First district, for the section of the Park Place, William and Clark street subway from the Seventh avenue subway in West Broadway through Park Place and under the postoffice building and Beekman street to William street in the borough of Manhattan. The contract was given to Frederick L. Cranford, Inc., the lowest bidder, who offered to do the work for \$1,571,363.

The commission has approved the award by the New York Municipal Railway Corporation to the Thomas Crimmins Contracting Company at \$1,974,422, of the contract for the installation of the third-rail, etc., in the Fourth avenue subway, borough of Brooklyn, between the Manhattan bridge and Eighty-sixth street. It has also approved the award made by the same corporation to the Terry & Tench Company, Inc., the lowest bidder at \$321,306 of the contract for the construction of additional tracks on the Broadway elevated railroad in the borough of Brooklyn between Havemeyer street and Myrtle avenue.

NIAGARA RIVER & EASTERN.—Under this name a company has been incorporated in New York with \$1,500,000 capital, it is said, to build a railroad. The incorporators include F. C. Conette, Buffalo; C. Hickey, Lockport, and F. A. Dudley, Niagara Falls.

OIL BELT TERMINAL.—Incorporated in Oklahoma, with headquarters at Jennings, Okla., to build from Jennings, south to Drumright, thence west to Cushing, about 25 miles. It is understood that the line is eventually to be extended south into Lincoln county. Surveys are now being made. C. N. Haskell, Tulsa, former governor of Oklahoma, is back of the project, and H. Fulton is chief engineer.

SEABOARD AIR LINE.—An officer writes that it is undecided when the construction work will be carried out to complete the 22-mile line from Bartow, Fla., east via Alturas, and a point

north of Lake Wales, to about 1.6 miles east of Hard Luck lake. A grading contract was let in the early part of this year to A. F. Langford, Valdosta, Ga., and track has been laid on about 35 per cent of the line.

SOUTHERN PACIFIC.—The Susanville sub-division of the Salt Lake division has been extended from Susanville, Cal., to Westwood, 29.4 miles.

UVALDE & NORTHERN.—Arrangements are now being made, it is said, to resume construction work on this line, which was suspended on account of the financial stringency. Several miles have been graded on the first section under contract from Uvalde, Tex., north to the kaolin mines near Leakey. It is understood that the line is to be extended north to San Angelo, about 200 miles. L. J. Hurd, president, Kansas City, Mo.; F. H. Dillon, chief engineer, Sansom, Tex. (June 5, p. 1257.)

WAYCROSS & WESTERN.—This road has been extended from Sirmans, Ga., to Newgrade, two miles.

RAILWAY STRUCTURES

BENTLEY, IOWA.—The Chicago Great Western is contemplating the construction of a small passenger station at Bentley, Iowa. This company has also under construction a passenger station at Mason City, Iowa, which is of brick, hollow tile and stucco construction with a green tile roof. It is 107 ft. 6 in. by 32 ft. 6 in. in area and one story high. D. L. Stratton, Mason City, Iowa, is the contractor. The work is expected to be completed in about a month. At Conception, Mo., the Chicago Great Western and the Wabash are jointly building a passenger station. At this point the Wabash is elevated, while the Chicago Great Western runs below grade. The station is placed between the two elevations and will be used by both roads. T. S. Leake & Co., Chicago, is the contractor. Small passenger depots are also being built at Randolph, Minn., and at Dewar, Iowa. John Jacobs, Marshalltown, Iowa, is doing the work. The work completed by this railroad company consists of three 100-ton Holmen type coaling stations at the following points: Carroll, Iowa; St. Joseph, Mo., and Kenyon, Minn., and a wooden 50-ton coaling plant, Holmen type, at Red Wing, Minn. Roberts & Schaefer, Chicago, were the contractors. At Kansas City, Kan., four additional grain tanks have just been added to the company's grain elevator at that point. These tanks are of concrete construction and are 28 ft. in diameter and 85 ft. high, each, and have a total added capacity of 86,500 bu.

CARTHAGE, N. Y.—Contracts have been let by the New York Central & Hudson River for the elimination of the present grade crossings at West End avenue, at John street and at Pannery street, in Carthage, as follows: For the sub-structures to W. M. Ballard, for the superstructures to the Fort Pitt Bridge Works and for the waterproofing to Bird & Son, New York.

JACKSONVILLE, FLA.—A contract is reported let by the Atlantic Coast Line to E. W. Parker, Tampa, Fla., for putting up a storage building, 130 ft. by 267 ft. The proposed structure is to have retaining walls, foundations and floors of reinforced concrete with a wood superstructure. The cost of the improvements will be about \$45,000.

JANE LEW, W. VA.—The station at Jane Lew, W. Va., on the West Virginia & Pittsburgh division of the Baltimore & Ohio, which was recently destroyed by fire, will be rebuilt by the railroad company's forces. Work will be started at once.

NEW YORK.—The New York Public Service Commission, First district, has given the contract to the Rapid Transit Subway Construction Company at their bid of \$3,097,312 for building the diagonal station under Forty-second street and the connecting link between the existing subway and the new Lexington avenue subway, in the borough of Manhattan. (October 9, p. 671.)

PHILADELPHIA, PA.—The Public Service Commission of Pennsylvania has approved the track elevation contract entered into between the officers of the city of Philadelphia and the Philadelphia & Reading. The contract provides for the opening of Emerald and Tulip streets, which are to pass under the P. & R. elevated tracks between Lehigh avenue and Somerset street. The cost of the work, about \$1,000,000, is to be equally divided between the city of Philadelphia and the railroad company.

WAYCROSS, GA.—Work is now under way by the Atlantic Coast Line, it is said, on the foundations for an addition to the machine shops at Waycross.

Railway Financial News

ATLANTIC COAST LINE.—See Florida Central.

BALTIMORE & OHIO.—The following is an abstract of a circular sent to stockholders:

At the stockholders' meeting to be held on November 16, 1914, the stockholders will be asked to consider a plan for a general refunding and improvement mortgage, which will provide in a comprehensive way for present needs and future financial requirements of the company. This company has now outstanding bonds secured by its several mortgages as follows: Prior lien bonds \$75,000,000, maturing July 1, 1925; first mortgage bonds \$81,000,000, maturing July 1, 1948; redeemable on and after July 1, 1923; Pittsburgh junction & middle division bonds \$6,125,280, maturing November 1, 1925; Southwestern division bonds \$45,000,000, maturing July 1, 1925; Pittsburgh, Lake Erie & West Virginia system refunding mortgage bonds \$43,441,500, maturing November 1, 1941, redeemable on and after November 1, 1925. This company has also outstanding its convertible bonds \$63,250,000, maturing March 1, 1933, redeemable on and after March 1, 1923. In addition there are outstanding bonds secured by underlying mortgages on railroads forming a part of the system and subsidiary lines aggregating \$30,781,000 and maturing at different dates.

The market for other securities not having been favorable in the recent past it became necessary for the company to issue short-time notes for its requirements; the issue of such notes at present outstanding amounts to \$35,000,000, maturing June 1, 1915.

With the exception of the first mortgage, which provides for a further issue of \$1,000,000 of bonds each year for nine years, the several mortgages of the company afford no provision for future requirements. Consequently, there has been under consideration for some time past a plan for making a mortgage covering the entire system and subsidiary lines, under which bonds may be issued to retire existing indebtedness as it matures, and to provide funds needed from time to time for additions to and extension of the company's railroad and property, necessary for the further development of the important territory occupied by your lines and to care for the constantly expanding traffic.

The stockholders will be asked to consider a plan to meet the financial requirements of the company as above indicated and, if approved, to authorize the execution of a mortgage covering the entire system and subsidiary lines, under which bonds may be issued in series from time to time for refunding and other corporate purposes. Each series as issued will bear such rate of interest and generally be in such form as to best meet then existing conditions; but all will be equally secured by the same mortgage. It is proposed to limit the amount of bonds which may be issued under the mortgage to \$600,000,000, unless the stockholders should later give further consent to additional issue, but at no time shall the amount outstanding, together with all prior debt, exceed three times the capital stock of the company.

CHICAGO, ROCK ISLAND & PACIFIC.—Judge Mayer, in the federal district court, has denied the application of some of the railroad collateral bondholders to delay the sale of the collateral under the Railroad 4's, and has ordered this collateral sold. The protective committee, of which James N. Wallace is chairman, has announced the plan which this committee has for the purchase of the collateral. The plan provides for the purchase by the committee of the Railway company stock which is collateral for the Railroad bonds, and the distribution of this stock to depositing bondholders on the basis of ten shares of stock to each \$1,000 bond. If all the bondholders do not assent to the plan it will be necessary to raise cash to pay off the non-depositing bondholders. This is the only cash to be called for.

Holders of certificates of deposit for the bonds, who shall have complied with the conditions of the plan and the deposit agreement, and paid their proportionate share of the cash requirements, are to receive, on the completion of the plan and surrender of their certificates, for each \$1,000 bond represented: (1) ten shares of stock of the Chicago, Rock Island & Pacific Railway, the operating company; (2) their proportionate part

of so much of the pledged stock acquired by the committee as shall be in excess of the face amount of the deposited bonds, and that shall not have been disposed of by the committee as provided toward meeting the cash requirements; (3) a certificate entitling the holder to \$1,000 face amount of deposited bonds when stamped as required in the foreclosure suit to indicate the payment of the amounts paid or credited thereon out of the proceeds of sale of the pledged stock.

ERIE.—Robert W. Pomeroy, of Buffalo, N. Y., and M. D. Follansbee, of Chicago, have been elected directors, succeeding Charles A. Peabody and H. P. Davidson.

FLORIDA CENTRAL.—This road, running from Thomasville, Ga., to Fanlew, Fla., 47 miles, has been sold under foreclosure to the Atlantic Coast Line for \$22,000, subject to a mortgage which the Atlantic Coast Line holds for \$200,000.

NEW YORK CENTRAL & HUDSON RIVER.—Of the \$40,000,000 4½ per cent bonds which were offered by bankers in April at a price to yield 4.70 per cent, about \$8,000,000 remain unsold and these bonds are being offered at a price to yield 5.03 per cent.

The New York Public Service Commission, Second district, has unanimously approved the plan of consolidation of this company and of the Lake Shore & Michigan Southern. In part the commission says:

"We find nothing to indicate any intent on the part of the petitioners to over-capitalize either in stocks or bonds. The proposed stock issue of about \$250,000,000 by the new company is some \$50,000,000 in amount less than the combined capital stock of the constituents; while the outstanding bonded indebtedness of the new company on account of the New York Central-Lake Shore collateral trust bonds can at no time exceed the precise amount at that time unpaid of the original debt, whether represented by the original bonds or by the new 4's." The commission approves heartily of the system of financing to be adopted under the merger, and says that the consolidation of the properties would inure to the advantage of the general public.

In settling the question raised by opponents of the merger, as to whether or not an increase in the interest rates from 3½ per cent on Lake Shore collaterals to 4 per cent on new bonds to be issued in exchange therefore, constitutes a violation of the state railroad law in connection with the issue of additional securities, "in connection" or "in consideration for" consolidation, the commission is of the opinion that if the law were interpreted as argued by the objectors to the consolidation it would effectually prevent the issue of all refunding bonds in consolidation proceedings.

NEW YORK, ONTARIO & WESTERN.—F. L. Lovelace has been elected a director.

OHIO RIVER & COLUMBUS.—This road, which runs from Ripley, Ohio, to Sarginia, 22 miles, has been placed in the hands of Charles J. Finger, general manager, as receiver. The receiver was appointed on the application of the minority stockholders.

SOUTHERN RAILWAY.—See comments on the annual report and the reduction of dividends in the editorial columns; also reduction in salaries noted in general news columns.

Dr. Edwin A. Alderman, president of the University of Virginia; John Kerr Branch, a banker of Richmond; Dr. John C. Kilgo, bishop of the Methodist Episcopal Church and a resident of Durham, N. C., and Robert Jemison, of Birmingham, Ala., have been elected directors, succeeding W. W. Finley and H. C. Fahnstock, both deceased, and George F. Baker, Jr., and E. H. Gary, resigned. Charles Steele, of J. P. Morgan & Co., was re-elected, as were the other directors.

UNION PACIFIC.—The monthly statement of revenues and expenses for August contains the announcement that "in order to save the expense of issuing these statements monthly they will be discontinued, and hereafter a statement of operating revenues and operating expenses will be enclosed with the quarterly dividend check."

THE SWISS STATE RAILWAYS.—A press despatch states that the federal railways of Switzerland in August of this year, the month in which as a rule their earnings are largest, had traffic receipts of only \$2,002,000, showing a falling off of \$2,036,185 as compared with August, 1913—more than 50 per cent. The operating expenses, on the other hand, amounted to very little less than in 1913—\$1,963,400 as compared with \$2,199,288.

ANNUAL REPORT

TWENTIETH ANNUAL REPORT—SOUTHERN RAILWAY COMPANY

RICHMOND, VA., October 13, 1914.

To the

Stockholders of Southern Railway Company:

The Board of Directors submits the following report of the affairs of the Company for the year ended June 30, 1914:

This is the twentieth annual report of the Company and concludes the record of the administration under the Voting Trust, which was created on its organization in 1894. It is, therefore, a fitting time for retrospect, and the Board of Directors deems it appropriate to submit again to the stockholders, as a part of this report, the circular issued by the Voting Trustees under date of June 30, 1914, announcing the surrender of their trust. It will be found at page 12. This circular is not only a history of what this Company has accomplished, but, as it illustrates the growth of the industrial South during the past twenty years, serves also as an earnest of the future which may reasonably be expected for this Company.

The actual result of the operations for the year, and the financial condition of the Company at the close of the year, will appear by reference to the Income Statement (page 30) and the General Balance Sheet (pages 34 and 35), which are part of this report. It will be observed that the operating revenues continued to increase during the year, but that the rate of such increase (1.47 per cent.) was less than in recent years, while the rate of increase of operating expenses (4.76 per cent.) continued undiminished. The slackening in the general volume of business done in the United States, which has been so marked during the past year, was felt last of all in the South, but had become part of the problem of management of this Company with the opening of the calendar year 1914. The high level of expense of operation is maintained not so much by any natural economic law, not by any deliberate intention or neglect of management, as by general social tendencies which are in substantial measure abnormal and beyond control of management. It can hardly be expected that the operation of an American railroad shall be again on a normal basis unless, and until, the question of the railroads shall cease to be a factor in American politics. To state this fact is but to repeat the statement of the contemporary plight of the railroads which has been so frequently urged upon the American public in recent years. It is mentioned here simply to illustrate its application to the fortunes of Southern Railway Company.

An intelligent appreciation of what is meant by the Income Statement of a railway company is obscured for many people by the very size of the figures which make it up. To talk in millions, even of expenses and debts, seems to some to be riches. It is, therefore, illuminating to reduce the results of such a company as this to a smaller and more comprehensible unit, such as that applied to their own affairs by many of those who do business with a railway company. To that end we have adopted for the following statement the unit of \$100., and submit it here to show what have been the results for the year just closed and in order to demonstrate general tendencies. There are added similar units for the two three-year periods included in the past six years of the history of the Company.

OPERATING RESULTS REDUCED TO BASIS OF \$100.

	THREE YEARS ENDED JUNE 30,		YEAR ENDED JUNE 30, 1914.
	1911.	1914.	
Income:			
From Operations	\$94.77	\$95.18	\$95.51
From Interest, Dividends, Rents, Privileges, etc.	5.23	4.82	4.49
Gross Income	\$100.00	\$100.00	\$100.00
Disposition of Income:			
For Operating Expenses.....	\$64.20	\$67.22	\$69.44
For Taxes	3.41	3.59	3.68
For Rents of Roads Leased, Trackage Rights, Equipment, Privileges, etc.....	4.24	4.72	5.22
For Interest on Bonds, Notes, Equipment Obligations, etc.	18.70	15.62	15.02
For Discount on Securities Sold, charged to Income .....	.52	.04	...
For Additions to Property through Income .....	.11	.09	.12
Surplus	8.82	8.72	6.52
	\$100.00	\$100.00	\$100.00

Investment in Property:

Per \$100 of Revenue.....	\$592.41	\$528.68	\$518.48
Average return on Investment in Property..	1.49%	1.65%	1.36%

DIVIDENDS PAID:

Per \$100 of Income.....	\$0.67	\$3.96	\$3.71
Average Rate of Dividends.....	0.67%	4.67%	4.5%

DISCOUNT CHARGED TO PROFIT AND LOSS:

Per \$100 of Income.....	\$5.02	\$0.92	\$0.26
--------------------------	--------	--------	--------

The most significant item in this statement is the marked decrease in the average return on the investment in property, accompanied by constant additions to property through income and through new capital. This has resulted despite an increase in operating revenue and a decrease in the fixed charges and discount, and has been brought about chiefly by the increase in operating expenses and taxes.

TAXES.

It may be assumed that the stockholders and those of the intelligent public who may read this report are generally familiar with the causes and conditions which have contributed to the increase in operating expenses, but it seems appropriate to say a word here on the subject of the increase in taxes.

For the year the Company paid out for taxes \$2,679,389.67, an increase of \$199,002.39 over the previous year, or 8.02 per cent., as compared with an increase of 1.47 per cent. in operating revenues. Special attention

would not under ordinary circumstances be called to the question of taxes, but the growth of the item is becoming serious. The nature and use of railroad property make its earning power the obviously fair test of its duty to contribute to the support of government. It is expected that reasonable increases may be looked for as the revenues increase, but the current practice of arbitrary assessment of nominal value upon railroad property for the purpose of taxation and the ease with which such assessed values can be increased have made such property a main source of securing additional governmental revenue for purposes upon which the owners of railway property are not consulted. That the taxes of this Company have been increased out of proportion to the increase in its revenues will be apparent from the following statement of a ten year tendency:

Increase in revenue 1914 over 1905.....	44.42 Per Cent.
Increase in expenses 1914 over 1905.....	50.06 Per Cent.
Increase in taxes 1914 over 1905.....	93.90 Per Cent.

THE ADDITIONS TO CAPITAL ACCOUNT AND TO PROPERTY INVESTMENT.

The investment in Road and Equipment, exclusive of depreciation, increased \$4,137,859.79, of which \$3,000,698.08 was in Roadway and Structures and \$1,137,161.71 in Equipment. This increase represents net additions made during the year. (See pages 36 and 37.)

There was an increase of \$11,225,700 in outstanding Mortgage and Collateral Trust Bonds and Notes and \$3,238,000 in Equipment Trust Obligations. (See pages 39-41.)

On February 13, 1914, there were sold \$1,250,000 Southern Railway Company First Consolidated Mortgage Five Per Cent. Bonds, theretofore held by the Company.

On March 2, 1914, there were sold \$10,000,000 Southern Railway Company Three-Year Five Per Cent. Collateral Gold Notes, issued, pending a market for the sale of long term bonds, to provide funds for Additions and Betterments, chiefly terminals.

There were retired, at maturity, July 1, 1913, \$34,300 Charlottesville and Rapidan Railroad Company First Mortgage Six Per Cent. Bonds and \$5,000 Franklin and Pittsylvania Railroad Company First Mortgage Six Per Cent. Bonds; \$39,400 First Consolidated Mortgage Five Per Cent. Bonds were drawn on account thereof and placed in the treasury. By reason of these and previous drawings for similar purposes, and the sale of \$1,250,000 Southern Railway Company First Consolidated Mortgage Five Per Cent. Bonds, there remained free in the treasury on June 30, 1914, \$154,200 of these bonds.

During the year there were drawn and taken into the treasury \$5,000,000 Development and General Mortgage Four Per Cent. Bonds, which, under the terms of that mortgage, could be drawn for the calendar year 1914 for Additions and Betterments. There were also drawn and taken into the treasury \$1,131,000 of such Bonds representing the proportion of Equipment Trust Obligations paid during the year and charged to capital account.

The total amount of Development and General Mortgage Four Per Cent. Bonds owned by the Company on June 30, 1914, was \$32,123,000, of which \$16,667,000 are pledged as collateral under Southern Railway Three-Year Five Per Cent. Collateral Trust Indenture, dated March 2, 1914, leaving \$15,456,000 free in the treasury.

Double Track:

Negotiations were concluded during the year with The Atlanta & Charlotte Air Line Railway Company by which that Company undertook to issue its First Mortgage Bonds to the authorized amount of \$20,000,000., of which \$5,500,000. of 4½ per cent. bonds were issued and sold on July 1, 1914, to retire a like amount of outstanding bonds of that Company heretofore acquired and pledged under the First Consolidated Mortgage of Southern Railway Company, but subject to call, as they were called, by the obligor. The proceeds of the Atlanta & Charlotte Air Line bonds so sold thus made available to this Company a sum sufficient to complete the additional track on all of the main line between Washington and Atlanta (except the Atlanta & Charlotte Air Line), and this work is now in progress. The remainder of the \$20,000,000. of bonds authorized by the Atlanta & Charlotte Air Line mortgage are available for sale at any time and the proceeds will be applied to complete the double track on the Atlanta & Charlotte Air Line. With the completion of the work for which this plan makes financial provision, the entire main line from Washington to Atlanta, 649 miles, will be double track.

The total double track in operation at the close of the year was 402.64 miles, of which 17.25 miles were put in operation during the year, viz.: between Amherst and Monroe, Va., Cross Keys and Armour, Ga., between 27th Street, Birmingham, and east end of the Finley Yard at North Birmingham, Ala., and short stretches elsewhere.

Yards and Terminals:

Substantial progress was made during the past year in the construction of important and long needed additional terminal yards at Richmond, Va., at Spencer and Winston-Salem, N. C., at Mobile and at Finley (near Birmingham), Ala., and at Forrest (near Memphis), Tenn. Other work of this character is planned and will be undertaken with the proceeds of the note issue made during the year. New and additional spur and side tracks, aggregating 42.70 miles, were constructed.

Automatic Block Signals:

Electrical automatic block signals were completed and put in operation on the main line between Cameron Run and Orange, Va., a distance of 75 miles, making a total of 189.5 miles of such signals in operation at the close of the year. Similar signals are under construction on all other double track.

OPERATING CONDITIONS.

The effort has been made to supply in the report of the Vice-President and General Manager, and in the tables making up the report of the Comptroller, which are hereto attached, all the details which are necessary for a comprehension of the problem arising in current operations, but it is fitting to call attention here to some of the more salient facts. The most striking item in the year's accounts is the adverse balance in the item of hire of equipment. The increase of the debit to this account was \$606,786.79 as compared with the previous year. For several years past the account of hire of equipment has contributed to the income of the Company, but, beginning with September, 1913, the balance began to turn against us and so continued throughout the year. This is explained by two conditions:

(a) The actual reduction in the items of freight car equipment owned by the Company and by it contributed to the general car pool of the United States; such decrease resulting from retirement of old freight cars which had passed the stage of economical maintenance or, by reason of their original standards of construction, had become of obsolete type. This accounts for the fact that the average number of freight cars in service decreased 2.93 per cent., while the average capacity of freight cars in service increased 2.52 per cent. The result is that while the carrying capacity of the Company's equipment has not been materially diminished, the car hire account, which is based on a per diem per unit of equipment without regard to capacity, has suffered;

(b) The heavy movement throughout the year of empty foreign cars on the home route. Such a movement is always an acute symptom of a general business depression and is a measure of self defense to which every railroad has recourse under such circumstances. Its effect is felt most heavily by the lines like those of this Company which in times of prosperity have handled large numbers of cars originating their loadings in other territories.

With steady confidence that the prevailing business depression is temporary, the Board of Directors has dealt courageously during the year with the first item of this condition. To keep up and refresh the car supply normally required by the Company and so to balance the car hire account, orders were placed for 5,945 items of new freight cars, as well as for additional power and passenger equipment. The total cost of this equipment was \$7,828,688, a figure actually large but representing an investment at a most fortunate time for the purchaser, for, because of lack of other business, the equipment manufacturers made unprecedented prices. The result was that for the same money the Company secured a largely increased number of items of equipment as compared with any previous purchase, and, as the new equipment is of contemporary type and construction, was so enabled to make substantial progress in raising the general level of its equipment to modern standards.

The constant and unremitting effort of management under existing conditions of operation is, of course, to check the current tendency of encroachment of operating expenses upon operating revenues by the practice of greater efficiency, without too great demands for new capital. This is the most difficult, as, when successful, it is the most admirable, achievement in the operation of a railroad to-day. This Company's results have shown steady improvement and warrant cordial approval by the stockholders of the faithful and resourceful work of the technical operating officers.

The elements of efficiency gained in operations during the past six years, by reason of increased operating efficiency, as well as by what it has been possible to do in the way of elimination of grades and curves, enlargement of yards, construction of double track, additions to and lengthening of passing tracks and the substitution of heavier power, may be briefly stated as follows:

Comparing 1914 with 1908:

Increase in ton miles.....	36.3 per cent.
Decrease in freight-train miles.....	8.3 "
Increase in freight car miles.....	25.6 "
Increase in net tons per train mile.....	48.6 "
Increase in tons per loaded car.....	8.2 "
Increase in locomotive tractive power.....	12.3 "
Decrease in coal consumed per 100 ton miles....	31.4 "

By reason of its many branch lines over which, of necessity, arbitrary train service must be maintained, the average tons per freight-train mile is relatively low. This disability, however, is being largely overcome through the systematic rating of engines and loading of trains between termini on the main lines. Substantial progress has been made during the year in this respect, as will be noted from the following comparison:

	October-November, 1913.	July, 1914.
Gross tons per train mile:		
In the direction of heavy traffic.....	1,301 tons	1,442 tons
Per cent. of locomotive efficiency utilized....	92.1	97.4
In the direction of light traffic.....	721 tons	881 tons
Per cent. of locomotive efficiency utilized....	65.4	73.4
In both directions.....	1,017 tons	1,163 tons
Per cent. of locomotive efficiency utilized....	80.7	86.7

While the tonnage transported during the year was practically the same as that transported during the preceding year, the mileage made by freight trains decreased 5.31 per cent. and the tons handled per train mile increased 5.74 per cent.

Maintenance:

The maintenance accounts reflect the continuance of the policy of keeping the physical condition of the property up to a constantly increasing standard. The management would be glad to apply more money than has ever yet been spent on these accounts. The actual appropriations have been liberal, considering the revenues from which the funds are derived, and a review of what has been accomplished during the year brings the comforting assurance of substantial progress. There is great need of a reliable unit for measuring the efficiency of maintenance of railway property. The accepted units, based on dollars alone, may mean efficiency, or, when compared with the similar units of other companies having different physical conditions and maintenance equipment, they may mean parsimony or they may mean extravagance, but in no event do they reveal any of these things. It may be said that the management of this Company believes that under its conditions it has got a dollar's worth of work for most of the dollars disbursed in these accounts, and with that statement the following figures are submitted, viz.:

COST TO MAINTAIN:

(Exclusive of renewals and depreciation.)

	1913.	1914.
A mile of track.....	\$1,413.68	\$1,387.86
A locomotive	2,621.17	2,729.58
A freight-train car	64.29	76.44
A passenger-train car	739.11	786.20
The ratios of the total of such expenses to revenues have been		
Maintenance of Way and Structures.....	13.54	13.09
Maintenance of Equipment.....	16.48	17.22
Total Maintenance ratios.....	30.02	30.31

While the charge to expenses on account of Maintenance of Way and Structures showed a nominal decrease of 1.90 per cent., the actual expenditures for upkeep, as shown in detail in the Vice-President and General Manager's report, were \$197,696.85 greater than for the previous year. This is explained by a modification of the technicality of accounting.

TRAFFIC CONDITIONS.

It will be noted from the statistics that while the revenue derived from the transportation of passengers increased \$784,293.27, or 4.30 per cent., the passenger-train miles increased 5.63 per cent. This increase in the Company's passenger trains reflects its policy and desire to provide adequate passenger train service. This policy has been liberal to the point of daring and it has accomplished much for the upbuilding of the South. It has, however, an effect on income which should not be overlooked. Passenger train miles for the year aggregated over 52 per cent. of the total revenue train miles and exceeded the mileage made by freight trains by 2,607,216 miles, while revenue from passengers was only 27.62 per cent. of the total revenues from transportation.

The general depression in business conditions that prevailed throughout the United States and more particularly during the last six months of the fiscal period, while less acute in the South than in other parts of the country, was responsible for decreases in important items of this Company's freight traffic, as follows:

Pig Iron, Steel Rail and Fastenings, Manufactured	
Iron and Structural Steel.....	108,698 tons
Cement, Brick, Lime and Fire Clay.....	48,527 tons
Lumber, Shingles, Staves, Headings, etc.....	99,466 tons

256,691 tons

Abundant grain crops in Southern Railway territory

resulted in a decrease in the movement of grain, grain products and hay, principally from the West, of

228,489 tons

The failure of the Georgia peach crop resulted in a

decrease in the movement of that commodity of

45,013 tons

Total

530,193 tons

That there should have been an increase of 200,867 tons in the total movement, and an increase of \$133,300.02 in revenue from Freight Traffic, regardless of the heavy decreases in these five important items, indicates the rapid development of diversified industry and general business throughout the South, and the strong position of the Southern Railway with relation to it.

BUSINESS CONDITIONS.

The effect upon business in the United States of the European war, coming on top of a period of general business hesitation, has been apparent in the revenues of the Company since the close of the fiscal year. The South particularly has been hard hit, for it is peculiarly dependent upon the stability of the price and market for its cotton crop. While the tonnage of this staple represents a comparatively small percentage of the total tonnage hauled by this Company, any disturbance which affects its sale has far reaching influence on business generally, as it limits the purchasing power of the producer.

While the Company may be expected to suffer alike with other forms of industry in the South, it behooves it to set an example of patience and fortitude, which qualities, together with faith in the future, are most needed in this period of distress.

In such a crisis, when more than ever it is apparent that the interests of the Railway Company are identical with those of the public, it serves and that it can prosper only as the communities which it serves develop and grow, it is gratifying to be able to state that there has never been a time within its history when the relations of Southern Railway Company were more close and cordial with the people of the South than now. The determination of the management at all times to deal frankly and fairly with the public has been instrumental in bringing about this condition. The era of suspicion and distrust on the part of the public seems to be nearing an end, and the purposes and ideals of the Company are beginning to be understood and approved. No better omen for the future of the Company can be found than that discernible in the growing good will in the public mind.

DIVIDENDS.

The loss in revenue since the beginning of the European war and the outlook for the immediate future have demanded a strict policy of retrenchment, always a disagreeable duty. The consequent reduction of service of employees means a reduction of the opportunity of many men to earn the livelihood to which they have been accustomed, and it has seemed fair to the officers that they too should share the sacrifice, so that as a temporary measure the salaries of all officers earning in excess of \$2,500. per annum have been voluntarily and loyally reduced in fair proportions. Under these circumstances the Board has deemed that it was fair also for the preferred stockholders to share the necessities of the situation. Accordingly, although the full five per cent. on the preferred stock was safely earned for the year before the current acute conditions were apparent, the dividends declared for the year were reduced from 5 per cent. to 4½ per cent. Furthermore, the dividend for the second half of the year was declared payable not in cash but in scrip, redeemable in five years and meanwhile bearing interest at the rate of 4 per cent. per annum.

SERVICE OF EMPLOYEES.

The faithfulness, loyalty and ability of its officers and employees constitute one of the prime assets of Southern Railway Company. In tendering its thanks to each officer and employee for the faithful and intelligent service rendered during the past year, the Board desires to express its gratification at the high morale that obtains among the great number of individuals in the rank and file, and to record its confidence in, and its appreciation of, the men making up the organization. Not only departmental unity but individual loyalty exists. As a result co-operation among the officers and the men and between the men themselves has been developed to an extraordinarily high degree. This growing spirit of cohesiveness and unity of purpose is a source of pride to the management and foretells for the future better results both for the public and the Company. Individual membership in an organization of such generally recognized ability and high character may well be, as it is, considered a badge of honor.

ACCOUNTS AND STATISTICS.

Statements of the accounts and statistics of the Company in detail will be found in the tables hereto annexed.

The accounts have been examined, as usual, by Certified Public Accountants, Messrs. Patterson, Teele & Dennis, and their certificate is made a part of this report.

Appended to this report is a minute of the resolution adopted by the Board on December 1, 1913, following the death at his home in Washing-

ton, D. C., on November 25, 1913, of William Wilson Finley, late President of this Company.

It has also been the sad duty of your Directors to record the death, which occurred at his home in New York, on June 4, 1914, of their esteemed associate, Mr. Harris C. Fahnestock, who had been a faithful and valuable member of the Board since the organization of the Company.

Respectfully submitted, by order of the Board,

FAIRFAX HARRISON,

President.

TABLE 4.

GENERAL BALANCE SHEET, JUNE 30, 1914, AND JUNE 30, 1913.

ASSETS.		LIABILITIES.	
JUNE 30, 1913.	JUNE 30, 1914.	JUNE 30, 1913.	JUNE 30, 1914.
Property Investment:		Capital Stock:	
ROAD AND EQUIPMENT:		Common	
Investment to June 30, 1907:		Preferred	
Road	\$287,434,900.33	Total	
Equipment	46,672,108.87	\$180,000,000.00	
Total	\$334,107,009.20	Mortgage, Bonded and Secured Debt:	
Investment since June 30, 1907:		Mortgage Bonds:	
Road	\$23,528,767.94	Outstanding	
Equipment	19,967,276.62	Held by Company	
Total Investment since June 30, 1907	\$43,496,044.56	Total	
Total Road and Equipment.....	\$377,603,053.76	\$230,769,200.00	
Less: Reserve for Accrued Depreciation on Equipment.....	14,995,466.18	Collateral Trust Bonds, Notes and Certificates:	
Total Net Road and Equipment....	\$362,607,587.58	Outstanding	
SECURITIES:		Held by Company	
Securities of Proprietary, Affiliated and Controlled Companies, Pledged:		Total	
Stocks	\$2,487,586.26	\$29,842,700.00	
Bonds	21,508,920.74	Other Notes, Outstanding	
Total	\$23,996,507.00	Total	
2,000,000.00	\$24,014,007.00	\$265,718,900.00	
Bonds Issued or Assumed, Pledged....		Equipment Trust Obligations (See Table 6)	
Securities of Proprietary, Affiliated and Controlled Companies, Unpledged:		Total	
Stocks	\$116,887.21	\$284,102,900.00	
Bonds	678,418.75	Working Liabilities:	
Total	\$795,303.96	Loans and Bills Payable	
OTHER INVESTMENTS:		Traffic and Car Service Balances due to other Companies	
Advances to Proprietary, Affiliated and Controlled Companies for Construction, Equipment and Betterments....		Audited Vouchers, Accounts and Wages Unpaid	
MISCELLANEOUS INVESTMENTS:		Miscellaneous Accounts Payable	
Physical Property		Matured Interest, Dividends and Rents Unpaid, including amounts due July 1.	
Securities, Pledged		Matured Mortgage Bonds not presented for Redemption	
Securities, Unpledged		Other Working Liabilities.....	
Total		Total	
\$408,234.86		\$13,892,339.29	
\$401,844.24		Accrued Liabilities Not Due:	
33,640,943.91		Unmatured Interest and Rents Payable..	
9,283,027.94		Taxes	
\$43,325,816.09		Total	
\$43,734,050.95		\$2,848,390.92	
Working Assets:		Deferred Credit Items:	
Cash		Operating Reserves	
Securities Issued or Assumed, or Held in Treasury		Other Deferred Credit Items.....	
Marketable Securities:		Total	
Stocks		\$3,819,913.08	
Bonds		Appropriated Surplus:	
Loans and Bills Receivable.....		Dividend No. 26, 2½ Per Cent, on Preferred Stock, paid in October, 1913...	
Traffic and Car Service Balances due from other Companies		Scrip Dividend No. 28 on Preferred Stock—2%	
Balances due from Agents and Conductors		Additions to Property since June 30, 1907, through Income	
Miscellaneous Accounts Receivable.....		Insurance Reserve Fund	
Material and Supplies.....		Total	
Other Working Assets.....		\$2,620,540.69	
Total		Profit and Loss.....	
\$46,605,032.52		\$18,676,904.51	
Accrued Income Not Due:		GRAND TOTAL	
Unmatured Interest, Dividends and Rents Receivable		\$505,960,988.49	
Deferred Debit Items:		GRAND TOTAL	
Temporary advances to Proprietary, Affiliated and Controlled Companies.....		\$484,384,306.57	
Working Funds		GRAND TOTAL	
Other Advances		\$505,960,988.49	
Insurance Premiums Paid in Advance....		GRAND TOTAL	
Taxes Paid in Advance.....		\$505,960,988.49	
Unextinguished Discount on Securities...		GRAND TOTAL	
Special Deposits		\$505,960,988.49	
Cash and Securities in Sinking and Redemption Funds		GRAND TOTAL	
Cash and Securities in Insurance Reserve Fund		\$505,960,988.49	
Other Deferred Debit Items.....		GRAND TOTAL	
Total		\$505,960,988.49	
\$7,147,719.05		GRAND TOTAL	
\$484,384,306.57		GRAND TOTAL	

